341
Biography

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Alfred Nobel

THE
NOBEL PRIZE-WINNERS
AND THE NOBEL FOUNDATION
1901—1937

Edited by

T.W. MAC CALLUM, O.B.E., M.A. and STEPHEN TAYLOR, R.P.D.

with an Introduction by

Professor GILBERT MURRAY, Oxford University

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CONTENTS

Page

INDEX V

PREFACE VII

INTRODUCTION by Prof. GILBERT MURRAY (Oxford University) . IX

PART ONE: THE NOBEL FOUNDATION

I. Alfred Nobel. His life and work 3
II. The testament 13
III. The Nobel foundation and its institutions 15
IV. The nationality of the prize-winners 22
V. The finances of the Nobel foundation 24

PART TWO: BIOGRAPHY OF PRIZE-WINNERS

I. Bearers of the prize for physics 29
II. Bearers of the prize for chemistry 109
III. Bearers of the prize for physiology and medicine 171
IV. Bearers of the prize for literature 245
V. Bearers of the peace prize 326

PART THREE: PORTRAITS AND SIGNATURES OF PRIZE-WINNERS

I. Bearers of the prize for physics 391
II. Bearers of the prize for chemistry 437
III. Bearers of the prize for physiology and medicine 477
IV. Bearers of the prize for literature 519
V. Bearers of the peace prize 557
VI. Facsimile of Nobel medals 597

INDEX

(Ch. = Chemistry, L. = Literature, M. = Medicine, P. = Peace, Ph. = Physics)

Page
Addams (P. 1931) 377, 589
Adrian (M. 1932) 226, 509
Anderson (Ph. 1936) 103, 434
Angell (P. 1934) 381, 591
Aristarchi Bey 329
Arnoldson (P. 1908) 344, 568
Arrhenius (Ch. 1903) 17, 115, 441
Asser (P. 1911) 349, 572
Aston (Ch. 1922) 144, 458

Baeyer (Ch. 1905) 120, 443
Bajer (P. 1908) 345, 569
Banting (M. 1923) 207, 499
Bárány (M. 1914) 201, 494
Barkla (Ph. 1914) 67, 413
Becquerel (Ph. 1909) 37, 396
Beernaert (P. 1909) 346, 570
Behring (M. 1901) 173, 479
Benavente (L. 1922) 296, 542
Bergius (Ch. 1931) 158, 468
Bergson (L. 1927) 306, 547
Björnson (L. 1903) 251, 523
Bohr (Ph. 1923) 76, 418
Bordet (M. 1919) 202, 495
Bosch (Ch. 1931) 155, 467
Bourgeois (P. 1920) 358, 577
Bragg, W. H. (Ph. 1915) 64, 411
Bragg, W. L. (Ph. 1915) 66, 412
Branting (P. 1921) 359, 578
Braun (Ph. 1909) 52, 405
Briand (P. 1926) 367, 583
Broglie, De (Ph. 1929) 93, 427
Buchner (Ch. 1907) 124, 443
Buisson (P. 1927) 371, 585
Bunin (L. 1933) 320, 553
Butler (P. 1931) 379, 590

Carducci (L. 1906) 260, 527
Carrel (M. 1912) 199, 492
Chadwick (Ph. 1935) 100, 432
Chamberlain (P. 1925) 364, 581
Cecil (P. 1937) 386, 595
Cleve 11 f.
Compton (Ph. 1927) 87, 424
Cremer (P. 1903) 336, 563
Curie, Marie (Ph. 1903 and Ch. 1911) 39, 132, 398, 449
Curie, Pierre (Ph. 1903) 39, 397

Dale (M. 1936) 239, 516
Dalén (Ph. 1912) 58, 408
Davisson (Ph. 1937) 104, 435
Dawes (P. 1925) 366, 582
De Broglie (Ph. 1929) 93
Debye (Ch. 1936) 166, 473
Deledda (L. 1926) 305, 546
D'Estournelles (P. 1909) 347, 571
Dirac (Ph. 1933) 98, 431

Page
Ducommun (P. 1902) 334, 561
Dunant (P. 1901) 332, 559

Echegaray (L. 1904) 256, 525
Ehrlich (M. 1908) 189, 487
Eijkman (M. 1929) 217, 505
Einstein (Ph. 1921) 73, 417
Einthoven (M. 1924) 210, 501
Estournelles (P. 1909) 347
Eucken (L. 1908) 264, 529
Euler-Chelpin (Ch. 1929) 153, 465

Fibiger (M. 1926) 211, 502
Finsen (M. 1903) 177, 481
Fischer, E. (Ch. 1902) 113, 440
Fischer H. (Ch. 1930) 154, 466
France (L. 1921) 294, 541
Franck (Ph. 1925) 83, 421
Fried (P. 1911) 350, 573

Galsworthy (L. 1932) 318, 552
Gard, Du (L. 1937) 326, 556
Geneva, Int. Peace Office (P. 1910) 348
Ghent Institute for Int. Law (P. 1904) 337
Gjellerup (L. 1917) 286, 537
Gobat (P. 1902) 335, 562
Golgi (M. 1926) 184, 484
Grignard (Ch. 1912) 133, 450
Guillaume (Ph. 1920) 72, 416
Gullstrand (M. 1911) 198, 491

Haber (Ch. 1919) 140, 455
Hamsun (L. 1920) 291, 540
Harden (Ch. 1929) 151, 464
Hauptmann (L. 1912) 274, 533
Haworth (Ch. 1937) 167, 474
Heidenstam (L. 1916) 284, 536
Heisenberg (Ph. 1932) 97, 429
Henderson (P. 1934) 383, 592
Hertz (Ph. 1925) 85, 422
Hess (Ph. 1936) 101, 433
Heyse (L. 1910) 269, 531
Hill (M. 1922) 205, 497
Hoff, Van 't (Ch. 1901) 111, 439
Hopkins (M. 1929) 220, 506

Joliot, F. (Ch. 1933) 164, 471
Joliot-Curie, I. (Ch. 1933) 165, 472
Junk, V. VII, VIII

Kamerlingh Onnes (Ph. 1913) 60, 409
Karlfeldt (L. 1931) 316, 551
Karrer (Ch. 1937) 168, 475
Kellogg (P. 1930) 375, 587
Kipling (L. 1907) 262, 528
Koch (M. 1905) 181, 483
Kocher (M. 1909) 194, 489
Kossel (M. 1910) 196, 490
Krogh (M. 1920) 203, 496

La Fontaine (P. 1913) 353, 575
Lagerlöf (L. 1909) 10, 266, 530

Page
Lamas Saavedra (P. 1936) . . . 385, 594
Landsteiner (M. 1930) 222, 507
Lange (P. 1921) 18, 360, 579
Langmuir (Ch. 1932) 160, 469
Laue (Ph. 1914) 62, 410
Laveran (M. 1907) 187, 486
Lenard (Ph. 1905) 42, 400
Lewis (L. 1930) 313, 550
Lilljequist . . . . 14 f.
Lindberg 12, 21
Lippmann (Ch. 1908) 48, 403
Ljungström 7
Lorentz (Ph. 1902) 33, 394
Loewi (M. 1936) 241, 517
Lövland 11

Macleod (M. 1923) . . . 208, 500
Maeterlinck (L. 1911) . . 272, 532
Mann (L. 1929) 310, 549
Marconi (Ph. 1909) . . . 50, 404
Maupassant 10
Metchnikov (M. 1908) . . 191, 488
Meyerhof (M. 1922) . . . 206, 498
Michelson (Ph. 1907) . . 46, 402
Millikan (Ph. 1923) . . . 78, 419
Minot (M. 1934) 234, 513
Mistral (L. 1904) 254, 524
Moissan (Ch. 1906) . . . 122, 444
Mommsen (L. 1902) . . . 249, 522
Moneta (P. 1907) 342, 566
Morgan (M. 1933) 228, 511
Murphy (M. 1934) 236, 514

Nansen (P. 1922) 362, 580
Nernst (Ch. 1920) 141, 456
Nicolle (M. 1928) 215, 504
Nobel, Alfred . . . . . . 3 ff.
Nobel, Immanuel . . . . . 3 f.
Nobel, Ludwig 3
Nobel, Robert 3

Oesterman 12
O' Neill (L. 1936) 324, 555
Ossietzky (P. 1936) . . . 23, 384, 593
Ostwald (Ch. 1909) . . . 128, 447

Passy (P. 1901) 333, 560
Pavlov (M. 1904) 179, 482
Peace Office, Int. (P. 1910) . . 348
Perrin (Ph. 1926) 86, 423
Pirandello (L. 1934) . . . 322, 554
Planck (Ph. 1918) 69, 414
Pontoppidan (L. 1907) . . 288, 538
Pregl (Ch. 1923) 145, 459
Prudhomme (L. 1901) . . 247, 521

Quidde (P. 1927) 373, 586

Raman (Ph. 1930) 95, 428
Ramon y Cajal (M. 1906) . . . 185, 485
Ramsay (Ch. 1904) 118, 442
Rayleigh (Ph. 1904) 40, 399
Red Cross committee (P. 1917) . . 354

Page
Renault (P. 1907) 343, 567
Reymont (L. 1924) 300, 544
Richards (Ch. 1914) 137, 453
Richardson (Ph. 1928) 90, 426
Richet (M. 1913) 200, 493
Rolland (L. 1915) 279, 535
Röntgen (Ph. 1901) 31, 393
Roosevelt (P. 1906) 340, 565
Root (P. 1912) 351, 574
Ross (M. 1902) 175, 480
Rudbeck, Olof 9
Rutherford (Ch. 1908) 126, 446
Rydberg 10

Sabatier (Ch. 1912) 134, 451
Santesson 12
Schmidt, C. 7
Schrödinger (Ph. 1933) 99, 430
Schück . . . . VII, 11 f.
Shaw (L. 1925) 302, 545
Shelley . . . . 9 f.
Sherrington (M. 1932) 227, 510
Siegbahn (Ph. 1924) 80, 420
Sienkiewicz (L. 1905) 258, 526
Smith 7
Soddy (Ch. 1921) 143, 457
Söderblom (P. 1930) 376, 588
Sohlman . . . . VII, 11 f., 14 f.
Spemann (M. 1935) 238, 515
Spitteler (L. 1919) 289, 539
Stark (Ph. 1919) 71, 415
Stresemann (P. 1926) 369, 584
Suttner (P. 1905) . 10, 329 f., 338, 564
Svedberg (Ch. 1926) . . . 148, 461
Szent-Györgyi (M. 1937) . 243, 518

Tagore (L. 1913) 276, 534
Thomson, G. (Ph. 1937) . 106, 436
Thomson, J. J. (Ph. 1906) . 44, 401

Undset (L. 1928) 308, 548
Urey (Ch. 1934) 162, 470

Van der Waals (Ph. 1910) 54, 406
Van 't Hoff (Ch. 1901) . . 111, 439
Vigeland 21

Wagner-Jauregg (M. 1927) 213, 503
Wallach (Ch. 1910) . . . 130, 448
Warburg (M. 1931) . . . 224, 508
Werner (Ch. 1913) . . . 135, 452
Whipple (M. 1934) . . . 232, 512
Wieland (Ch. 1927) . . . 149, 462
Wien (M. 1911) 56, 407
Willstätter (Ch. 1915) . . 138, 454
Wilson, Ch. (Ph. 1927) . 89, 425
Wilson, W. (P. 1919) . . 356, 576
Windaus (Ch. 1928) . . . 150, 463

Yeats (L. 1923) 298, 543

Zeeman (Ph. 1902) . . . 35, 395
Zola 10
Zsigmondy (Ch. 1925) . . 146, 460

PREFACE

It is an event of more than ordinary interst for all the civilised world, an event, indeed, anticipated with curiosity verging on excitement, when, towards the close of each year, the names of those are published who have been distinguished by the Nobel Prize award. Up to the present moment the total number of prominent personalities, now living or deceased, who have thus been honoured, is roughly 200.

It appears fitting to furnish some uniform and comprehensive outline of their achievements and activities, the more so seeing that there is no book generally available for the British and American public that provides full information both about the life of Alfred Nobel and about his foundation, in regard to his testament and to the institutions connected with his bequest, at the same time dealing adequately with the work and achievements of those to whom the Nobel Prizes have been awarded.

An account of these outstanding achievements, to be sure, makes up a kind of history of the development of modern physics, chemistry, physiology, and medicine; it unrolls before us the most eminent creations of international literature, while the story of the peace movement, which owes its most powerful incentive to Alfred Nobel, is thereby illustrated and explained.

In regard to the great number of biographical details published with reference to Alfred Nobel himself, special mention should be made of the magnificent book by H. SCHÜCK and R. SOHLMAN, "Nobel, Dynamit - Petroleum - Pacifism," to which the present outline of Nobel's life and work owes valuable material. As to the description of the foundation and the biographies of the beneficiaries down to the year 1930, this English outline is in general based on Victor JUNK'S book, „Die Nobelpreisträger, Dreißig Jahre Nobelstiftung," published by M. Winkler, Vienna, 1930. Other sources employed were "Les Prix Nobel," an annual publication appearing after each yearly award, and the special biographic literature available to a considerable extent for most of the individual prize-winners. Some of the latter have also very kindly assisted us with autobiographic sketches. The great variety of these sources will explain the difference in the dimensions of the individual biographies. The majority of the portraits have been reproduced from the said book by Victor JUNK and from the Swedish publication, "Les Prix Nobel."

The Bureau of the Nobel Foundation has likewise greatly helped us in our work by the loan of very valuable material in the way of data, biographies, and photos. For this support, the editors of the present book would wish to express, in this place too, their sincere thanks.

INTRODUCTION

by

Professor GILBERT MURRAY (Oxford University)

There is little need to commend this book to the interest of the public. Few international honours have quite the glamour and fame of the Nobel Peace Prize. Partly there is romance in its origin: in the thought of the great scientific inventor of explosives, the philanthropic originator of all that is most destructive in modern war, turning his face away from the contemplation of his own triumphs and seeking after his death to set men searching, searching perhaps for ever, and for ever vainly, for the establishment of peace among men. Partly, of course, much as we all desire our various separate ends, there is nothing the whole world desires so much as peace.

Alfred Nobel left foundations for five prizes to be awarded for advances respectively in physics, chemistry, physiology and medicine, literature of an idealist tendency, and lastly peace. All are praiseworthy objects. All have attracted great and famous figures. We may notice, however, certain differences in their fortunes. In physics, chemistry and physiology the awards have been—to the best of my belief — uninterrupted and the names of the prizewinners stand high in the history of mankind; in imaginative literature the record is far less distinguished. Since the death of Tolstoy there have been very few names in European literature that one can associate with outstanding beauty or immortality. This age is clearly better at science than at poetry. In the list of the Peace Prizes, the first thing that attracts attention is the number of times in which it could not be awarded at all. That too is a comment upon the age.

The wording of the deed establishing the Peace Prize is worth attention. It is to be awarded to the person "who shall have most or best promoted the fraternity of nations and the abolition or diminution of standing armies and the formation or increase of peace congresses." Three rather different things, after all. The formation and increase of peace congresses offers no particular difficulty: the species is prolific. The abolition or diminution of standing armies, on the other hand, is a task that baffled a great World Conference for more than two years of continuous session, and resulted in the very opposite of was intended. The fraternity of nations is still far off; more nations are ready to accept it as an ideal than in Nobel's time, some few are more bitterly determined on its rejection. Yet I think, amid all our recent disasters and present fears, amid the apparent futility of congresses and the madness of the whole civilized world, we are decidedly nearer today than in the nineteenth century to the achievement of a genuine and permanent and indivisible peace.

The other prizes are awarded by suitable learned societies. The Peace Prize, by a shrewd and happy decision, was entrusted to a Committee of five persons selected by the Norwegian Storting and directed of course to pay no consideration to the nationality of the candidates. No other parliament in Europe or America could so well have discharged the task.

In looking through the list of prizewinners one seems to distinguish three classes. Sometimes the prize has been given to some eminent statesman or head of a state who presided at the making of an important peace treaty, such as Theodore Roosevelt who presided at the treaty of Portsmouth which concluded the Russe-Japanese war, or Senor Saavedra Lamas whose good offices brought about the cessation of the war between Bolivia and Paraguay. One is reminded of a similar award to the late Tsar for his devoted service to the Hague Conference.

Sometimes the award is made almost more to an act or activity than to a single individual. The joint award to Briand, Stresemann and Austen Chamberlain was really an award to the Treaty of Locarno. The prize in 1904 was given to the Institute of International Law, an interesting precedent. There are other bodies working continuously and quietly for good will between nations, whose claims might well be considered.

Then sometimes, and one's heart rejoices to see it, the prize is given to individuals of little rank or public power who have devoted their lives without other reward to the great cause of peace. One prizewinner was Mr. W. R. Cremer, founder of the Peace and Arbitration Society; another was Norman Angell, a journalist and writer, whose book "The Great Illusion" made a profound impression on Europe and whose private energies were consistently and unflaggingly devoted to the cause. In 1936 a bold award was made to a man in prison, a true martyr, long and bitterly persecuted by his government, though no charge either criminal or political could ever be brought against him, Ossietzky. In 1937 it fell to an English statesman who had resigned office and given up the prospect of very high political power because he was dissatisfield with the attitude of his party towards Peace, Lord Cecil.

The interesting feature in these awards is that, in different degrees, they show an international disinterested body daring to judge and if necessary to condemn the governments of great nations for lukewarmness in a cause which they all loudly profess. The men in office have greater opportunities than others to work for world peace and the fraternity of nations, but it seems that others, without those opportunities, have worked better. Before 1914 peace was held a less important issue than it is now. Future governments will perhaps feel disturbed in mind when they find private individuals, often not even Members of Parliament, considered by the disinterested Committee to have done more than they themselves towards the greatest of their political aims.

PART ONE

THE NOBEL FOUNDATION

I. ALFRED NOBEL
HIS LIFE AND WORK

Alfred NOBEL came of old Swedish peasant stock, whose surname, derived from the name of the Nöbbelöv boroughs in Schonen, was in its latinised form Nobelius, and subsequently, through elimination of the Latin ending, Nobell and Nobel. The pronunciation of the name is even now Nobell, with the stress on the second syllable.

It was a line of highly intelligent, ingenious men, many of them men of artistic endowments and scientific interests, men who early made their mark in technical improvements and inventions.

IMMANUEL NOBEL, Alfred's father (1801—1872), patented a whole series of inventions, including a planing-machine, a calendering-machine, a mechanical gear, and a hub-cutting device, but his fame and success were mainly due to his construction of mines for territorial and naval warfare, which found employment in the Crimean War in 1854, when the execution of the minelaying work on the basis of his inventions was entrusted by the Russian Government to his eldest son, Robert.

Alfred's brothers, the aforesaid ROBERT NOBEL (born 1829) and LUDWIG NOBEL (born 1831), were no less gifted and enterprising than their father. Thus Ludwig signally contributed to the development of rifle construction by his improvement of the single-cartridge rifle and its transformation into the so-called magazine rifle. Above all, it was the NOBEL brothers, financially supported by Alfred, who first systematically and industrially exploited the oil-wells of Baku, which thereby became one of the greatest oil-producing centres of the world.

Alfred NOBEL'S reticence in regard to himself was one of his most characteristic features. On one occasion, when called upon by his brother Ludwig to write his autobiography, he declined with the sarcastic remark that the most he could do would be to make up a reference card about himself on the following lines:

"AlfredNobel — pitiable demi-man; ought to have been put to death by a humane physician when first he came squealing into the world.

Chief Merits: keeping his finger-nails clean and never being incumbent on any one.

Chief Faults: no family, poor spirits, and a bad digestion.

Chief and only Wish: not to be buried alive.

Chief Sin: not worshipping Mammon.

Outstanding Events in his Life: none."

It was at Stockholm, on October 21st, 1833, that Alfred NOBEL was born. In the year 1842 the family removed to St. Petersburg, where Alfred's education was entrusted to a very good private tutor. His training for the profession of a technical engineer, included various travels, which even took him as far afield as America. Of a weak constitution, he impaired his health by over-exertion at his studies, and as early as 1854 he was obliged to take the waters at Franzensbad. As from 1863 he resided at Stockholm with his parents.

At an early age he started occupying himself with nitro-glycerine, at that time still a novelty. In 1862 he had already succeeded in causing a mixture of gunpowder and nitro-glycerine to explode under water, the explosive force of the gunpowder being greatly enhanced by the admixture. A slight difference of opinion between Alfred and his father, who was inclined to regard himself as the inventor of this mixture, was soon amicably settled, the patent being awarded the son. Thus, when in 1868 both father and son were distinguished by the Letterstedt Prize of the Swedish Academy of Sciences—the father "for merits in connection with the application of nitro-glycerine as an explosive in general" and the son "for his invention of dynamite"—it was a recognized fact that the former discovery, which was of such eminent practical significance, was likewise due to Alfred NOBEL.

Meanwhile, the new explosive—this mixture of gunpowder and nitro-glycerine—was manufactured for sale at Immanuel NOBEL'S works at Heleneborg, until, on September 3rd, 1864, a terrible catastrophe occured: the new factory blew up, several persons lost their lives, among them a younger brother of Alfred NOBEL'S, the father's energy was destroyed, and the whole enterprise was threatened with ruin. It was saved, however, by the intervention of Alfred, who founded a "Nitro-Glycerine Company" and started the first real nitro-glycerine works in the world.

But this was not enough to satisfy Alfred NOBEL. The very explosive qualities of nitro-glycerine formed an obstacle to its easy manipulation, to which its fluid form was also a hindrance. Here Alfred NOBEL'S inventive genius again stepped in with the construction of detonators and the use of fulminate of mercury for the initial charge of nitro-glycerine (the so-called "Nobel Detonator"). This invention, repeatedly described by experts "as the greatest step forward in the technical science of explosives since the invention of gunpowder" (v. Schück and Sohlman, p. 82), was, however, in its turn excelled by NOBEL'S most eminent discovery—that of the explosive to which he gave the name of dynamite.

After the ghastly catastrophe of Heleneborg near Stockholm in the year 1864, the preparation of this dangerous explosive within the territory of the city was forbidden by the authorities. Therefore, NOBEL removed the factory to a float anchored in a sound of Lake Mälar. In the following year, however, new works were erected at Vintervik near Stockholm. At the same time, with a view to acquiring a wider market, a joint-stock company was founded at Hamburg under the style of "Alfred Nobel & Co." But the manipulation of the new, at that time still fluid, explosive, which had meanwhile come to be known throughout the world, was still extremely dangerous and had, in various places, caused such serious explosions and catastrophes that it failed to inspire confidence, so that the business side of the enterprise was threatened with ruin.

But NOBEL found a clever way out of this difficulty; he mixed the fluid explosive oil with a solid absorbent, charcoal or sawdust, cement or brickdust, and, in particular a diatomic earth known as kieselguhr, thus obtaining a plastic substance, in no wise inferior in effect to the fluid oil, but far less sensitive in manipulation. This substance he called "guhr-dynamite" or simply "dynamite". The idea of this invention, of rendering the oil handier and less dangerous by its absorption by porous materials, had already occurred to him in 1863, but it was not until 1866 that it found practical execution at the works at Krümmel near Hamburg. Subsequently, NOBEL employed other porous materials too, such as chalk, gypsum, sand, or sugar, thereby obtaining various grades of dynamite, ranging from the weakest to the most highly explosive.

Dynamite proved to be of the most pronounced practical significance: not only mining benefitted by the new explosive; railway traffic was eminently advanced by the easier construction of tunnels, road construction was facilitated, and blasting below the surface of the water initially rendered possible. Within a space of eight years no fewer than fifteen NOBEL dynamite factories were erected.

In the year 1873 NOBEL went to live in Paris, where he remained until 1890. His laboratory was established at Sévran-Livry.

Later on (1875), guhr-dynamite was replaced by gelatine-dynamite, or what is known as "blasting gelatine". A further improvement was effected by the addition of materials participating in the explosion, whereby the effect was enhanced.

NOBEL'S next invention was smokeless nitro-glycerine powder or "ballistite", also known as "Nobel powder", for which he took out patents in 1887 and 1888. It has the advantage, when fired from a gun or rifle, of forming no more than a light, transparent cloud, which is speedily dispersed. For this reason its invention caused considerable sensation in all military circles, affording as it did a very valuable new asset for military tactics. Italy tock the lead, in 1889, by erecting a factory for Nobel powder, a step which caused great concern in France, if only for the fact that competition was feared with the smokoless powder invented by VIEILIE. NOBEL was vehemently attacked, nay, even persecuted and, since he lived and worked in France, suspected of espionage; his laboratory at Sévran-Livry was closed by order of the Government. This fact and further molestation caused him to remove his abode and his laboratory to San Remo in 1891.

Great Britain, too, was greatly interested in the new military explosive: a committee appointed by the Government succeeded in procuring from NOBEL information as to the preparation and improvement of his invention and finally had the invention patented by the name of "cordite". NOBEL protested, and in 1894 a lawsuit ensued against the British Government for violation of patent rights, creating tremendous sensation. This suit NOBEL lost. He was greatly hurt, not on account of his material loss and the payment of very substantial legal costs, but because of the tort done to him and the disregard of his merit as an inventor. He gave vent to his indignation in a dramatic work, a parody called "The Patent Bacillus". "A sound sense of right and wrong," he wrote in a letter about that time, "ought not to rise from the mob to the crown, but rather to spread downwards from the summit."

A further invention was that of "progressive" smokeless powder, rendering it possible, in the use of firearms, to increase the initial speed of projectiles progressively. These inventions, meanwhile, by no means exhausted his conceptive ingenuity: the total number of patent applications filed by him in various countries is recorded as 355. Naturally, not all of these original cognitions were destined to bear fruit, many of them being fantastic or, at any rate, not practically thought out, but they bear witness to the great activity of his mind and to the urge, so characteristic of an inventive genius, to seek everywhere new channels and possibilities of construction. Among his other ingenious ideas, some were again in the realm of military technics, such as his rocket-projectile (air-torpedo), while others were eminently peaceful, e.g. his surrogates for rubber, guttapercha, for varnish, and even for leather, or his attempts in the manufacture of artificial silk. At the same time, he was ready to help other inventors and experimentalists in their work by providing them with the necessary capital; thus he assisted the brothers Birger an Fredrik LJUNGSTRÖM, who in 1895 constructed the first bicycle with changeable transmission, the so-called "Svea Veloziped", and the technical engineur C. SCHMIDT, of Paris, in his attempt to remove, by muffling, the irritating accessory sounds in gramophones.

The year 1895 saw the completion of the new laboratory at Björkborn, though NOBEL did not intend to give up his work at San Remo.

It was there, on December 10th, 1896, that death released him from a serious malady, and thereby put an end to all his plans and zealous endeavours.

Essentially, NOBEL had been self-educated: save in his early childhood, he had never attended a school. Nevertheless, he had acquired not only a practical technical and scientific knowledge, but also a comprehensive humanistic education. A cosmopolitan by reason of his self-instruction and his travels, he was an expert linguist, writing with equal ease and excellence profoundly conceived and linguistically perfected letters and essays in German, French, and English. His first poetic effort, written in English, earned the following verdict on the part of an English clergyman, one SMITH, whose opinion thereof the author had solicited: "Even for an Englishman I should consider it a surprising piece of work, but the wonder is a hundred times intensified by the fact that the writer is a foreigner." It is characteristic of the ease which NOBEL had acquired in expressing his thoughts in English, that he should later on have attempted to translate the poem in question into Swedish, his own native language. It is obvious that inventive genius, exceptional will-power, and practical business instinct were by no means the only features of this gifted mind. His sphere of interests, far from being limited to his practical activity, embraced many matters of medicine, literature, and humanity in general, of which we shall still have occasion to speak.

One of the most prominent features of his character was his readiness to help others. It is impossible to remain unmoved when reading the letters written to him by his mother; they plainly illumine the character of this "best of sons" who, without being happy himself, was constantly thinking of the happiness of others. Nor did the fact that he had repeatedly reaped ingratitude from unworthy beneficiaries of his kindness deter him from alleviating suffering wherever he encountered it. When, in 1889, his mother died and left him one-third of her fortune, which, after all, had been mainly made by himself, he employed it in the form of large bequests to the Carolinian Medico-Surgical Institution of Stockholm, the new Children's Hospital, the Central Gymnastic Institution, and other charitable purposes.

"It is a peculiarity of mine never to consider my private interests," he wrote in 1895 to his nephew Hjalmar NOBEL.

The great lonesomeness of his soul is poignantly depicted in a letter written to his sister-in-law, Edla, wife to his brother Ludwig, contrasting her happy family life with the emptiness of his own: "wandering around, without rudder or compass, like a purposeless, fate-stricken wreck, without any bright recollections of the past, without the fair, if fickle, light that illusions cast upon the future . . ., without a family, which is the only life we may expect beyond the present one, without friends for the healthy development of the heart, without enemies for that of the spleen, but with a gift for self-criticism that shows up every stain in unmasked ugliness and every inability in unveiled clearness" (Schück and Sohlman, p. 215). This melancholy trend of his natural disposition, accompanied by a brooding inclination for solitude, once induced this man, who was always travelling around, and whose only home was his laboratory, to exclaim, "I am disgusted with myself."

The experience he had had of bad people embittered him and would seem to have made him into a misanthrope, but "this pessimism was in reality merely another form of expression for Alfred NOBEL'S idealistic claims on life, while inwardly he was one of the most perfect optimists that ever were, a sort of dreamer who believed in the possibility of humanity being made happy by science, and in the eternal peace which would finally follow the barbarity of belligerent times." (P. 226.)

Alfred NOBEL was a direct descendant of Olof RUDBECK, that fantastic polyhistorian, anatomist, and musician of the 17th century, who sought to prove that the primeval seat of the human race and Plato's Atlantis had been in Sweden. And, like this ancestor of his, Alfred NOBEL also believed in an Atlantis. For the one of them it was the Sweden of olden days, for the other humanity in future ages. In this dreamland he himself largely lived, and to this dreamland he desired, by his gift, to open the way for humanity. A Rudbeckian he was, moreover, in his untiring love of work, in the great variety of his interests, in his superior intelligence, which, though certainly fashioned in the first place for practical tasks, had at all times a trend towards a dreamer's idealism and much of the poet's outlook on life."

And it is this poetic outlook that constitutes one of the most attractive features of NOBEL'S character as we see it. The idealism of the English poet, Percy Bysshe SHELLEY, with its love of humanity and love of peace, had made a deep impression on him. It was under this influence that, as early as 1851, he wrote an English poem which, by what it reveals of the soul of the eighteen-year-old youth and his outlook on life, is of autobiographic value. In a German translation („Du sagst, ich sei ein Rätsel"), it is reproduced in the book of Schück and Sohlman, p. 169 passim. His lament in regard to the eternally unsolved riddle of life, to his own joyless childhood, the frailty of his body, does not prevent him from looking upon life

> ". . . . . as a precious gift,
> A gem that Nature gave to each of us
> That we might polish it until its sheen
> Should finally reward us for our pains."

A girl he loved died, and he remained behind — "a silent hermit."

"Brothers and Sisters," a novel in Swedish, and a short story, "In Lightest Africa", remained unfinished.

Later on, when engaged with his great inventions, NOBEL had no more time to write poems or stories, but he was always a zealous reader and a severe critic of literature. He disapproved of ZOLA and the naturalistic novelists, being far more attracted by MAUPASSANT. His criticism is always subjective; he praises RYDBERG, the Swedish idealist, and likes the style of LAGERLÖF. All his life, he was interested in English literature.

Towards the end of his life, when he had lost the cordite lawsuit, he again took up his pen, as we have seen, to give vent to his hurt feelings. And on his sickbed he started writing a tragedy "Nemesis", in which he intended to treat the subject of Beatrice Cenci from quite a different standpoint from that of SHELLEY.

Unimportant as these writings, completed or attempted, may be from the point of view of literature, seeing that their poetic beauty is very often interrupted by didactic utterances of NOBEL'S views of life, they are valuable for a proper understanding of his character. The poetic vein apparent in his youth declined in later years, but his poetic nature he preserved throughout his lifetime. Again and again it came to the fore in his unaltered ardent interest in the noblest problems of life, and finally found magnificent expression in his testament and the gift it embodied.

That such a gifted mind should have felt in no mean degree the urge to impart itself to others is not surprising: in his numerous letters he found a means of expressing his thoughts and making suggestions. His very original style, the amplitude of his ideas, the colourful variety of his similes, all made him a masterly letter-writer. In the art of conversation, he was no less interesting. Bertha von SUTTNER relates: "To talk with Alfred NOBEL of the world and of men, of life and of art, of the problems of time and eternity, was mentally a most enjoyable experience. His conversation was as sparkling as it was earnest, while the perfection with which this Swede wrote and spoke German, French, and English was little short of miraculous. He was so eminently master of these languages in all their niceties that any one of them might well have been taken to be his mother-tongue." (comp. "Les Prix Nobel en 1901", p. 16.)

NOBEL was averse to society life with its formal gatherings, but very fond of an interchange of thoughts with intelligent people; he was never petty or narrow-minded, but always most liberal in his judgment of others, in his thoughts and his deeds. He disliked all forms of boosting, all monuments and press publicity; he would never even allow his portrait to be painted. Though he had no great opinion of distinctions and honours, he was highly appreciative of the honorary doctorship conferred on him in 1893 by the university of Uppsala. The greatest memorial in his honour he himself erected in the Prize that bears his name.

NOBEL died unmarried. In his youth he had loved a girl, whom death had taken from him. — The most admirable harmony prevailed between him and his staff: there was never any friction in his laboratories. His attitude in regard to labour is best illustrated by the fact that the operatives of the NOBEL Oil Company at Baku participated in the profits of the concern.

NOBEL was of delicate physical constitution. Even in his childhood he was often ailing; later on his weak health suffered under the effects of constant travel. After he had turned sixty (1893), his heart attacks became more and more serious, and on December 10th, 1896, he expired at his villa "Mio Nido" in San Remo. A young Swedish clergyman hastened from Paris to bring him the last greetings from his distant country; this was Nathan SÖDERBLOM, now Archbishop of Sweden. NOBEL'S ashes were carried to Stockholm and enshrined there according to his wish on December 29th at the northern cemetery, where both his parents and his brother Robert, the latter but shortly before deceased, had been interred.

A fairly large number of biographies of Alfred NOBEL have appeared in print.

A good, concise account of his life is that by P. T. CLEVE, "Alfred Nobel, sa vie et ses travaux", contained in Volume 1 of "Les Prix Nobel en 1901" (p. 1) with further bibliographic notes. The subsequent volumes of "Les Prix Nobel" likewise contain occasional biographic essays, e. g. that of 1905 in the address by J. LÖVLAND, Minister of State and Chairman of the Nobel Committee in the Norwegian Parliament (p. 62, passim).

The best and most detailed biography, with an ample indication of sources and numerous illustrations, is embodied in the book "Nobel, Dynamite-Oil-Pacifism, Authorised Edition of the Nobel Endowment, edited by H. SCHÜCK and R. SOHLMAN", to which reference has already been made. The authors of this first-class book, which minutely and religiously treats the subject of NOBEL'S life and activity, are Dr. Johan Henrik SCHÜCK, Prof. Emerit. of the History of Literature at Uppsala University, and Ragnar SOHLMAN, Commercial Councillor, who in 1893 (then a young engineer) was NOBEL'S assistant at San Remo, and subsequently for a time contucted his laboratory at Björkborn. Him NOBEL appointed one of the executors of his last will and testament. What we have in the foregoing pages related in regard to Alfred NOBEL is, in its essential points, based on the account given by these two men, an account substantiated by authentic data and permeated by the close association of personal contact.

The annual volumes of the official publication "Les Prix Nobel", at present edited by Professor Dr. Carl Gustaf SANTESSON of the Royal Carolinian Institution at Stockholm, contain the detailed reports of the prize distributions, with accounts of the accompanying ceremonies and banquets, besides short biographies and the portraits of the recipients, photos showing the diplomas and medallions distributed, and the so-called Nobel lectures delivered by those to whom the Prizes are awarded.

The portrait of NOBEL reproduced in this volume has been taken from the aforesaid biography by CLEVE in "Les Prix Nobel en 1901". A very lifelike portrait is that derived from Professor OESTERMAN'S painting and figuring at the commencement of the great biography by Schück and Sohlman. One of the best likenesses of NOBEL is, furthermore, reproduced on LINDBERG'S Nobel medallion.

II. THE TESTAMENT

I, the undersigned Alfred Bernhard NOBEL, do hereby, upon mature consideration, declare my last will in regard to such property as I shall be able to leave at the time of my death to be as follows: . . . . ."

(There here follow certain stipulations regarding smaller legacies to individuals. The will then proceeds:)

"The entire remainder of my realisable property is to be disposed of in the following manner.

"The capital, which is to be invested by the executors in reliable securities, is to form a fund, the interest of which is year by year to be distributed in the form of prizes among those who have, within the respective twelvemonth successively elapsed, rendered the greatest services to mankind.

"The interest shall be divided into five equal portions and shall be allotted in the following way: one part to be given to him who has made the most important discovery or invention in the realm of physics, one part to him who has made the most important chemical invention or improvement, one part to him who has made the most important discovery in the realm of physiology or medicine, one part to him whose achievement has been most excellent in an idealistic sense in the realm of literature, and one part to him who has striven most or best for the fraternisation of the peoples and for the abolition or diminution of standing armies, as also for the inception and promotion of peace congresses.

"The prizes for physics and chemistry are to be awarded by the Swedish Academy of Sciences, those for physiological or medical works by the Carolinian Institution at Stockholm, those for literature by the Academy at Stockholm, and those for the champions of the cause of peace by a committee of five persons, to be elected by the Norwegian Storthing.

"It is my express wish that in the distribution of the prizes no regard shall be had for nationality, so that the prize shall in each case go to the worthiest, whether he be a Scandinavian or not.

"As executors of these testamentary dispositions of mine I appoint Herr Ragnar SOHLMAN, residing at Bofors, Värmland, and Herr Rudolf LILLJEQUIST, of 31, Malmskilnadsgatan, Stockholm, and Bengtsfors in the vicinity of Uddavalla.

"This testament is henceforth the sole valid one and shall be taken to annul all my former testamentary dispositions, supposing any of them to be forthcoming after my death.

"Finally, I declare it to be my express wish and will that after my death the arteries of my pulses be opened, and that, when this has been done and when competent physicians have established unmistakable signs that life is extinct, my body be burned in a so-called crematorial oven.

(dated:) Paris, November 27th, 1895.

(signed:) Alfred Bernhard NOBEL."

III. THE NOBEL FOUNDATION AND ITS INSTITUTIONS

NOBEL had made his last will and testament without the aid of a solicitor, for which reason it was not devoid of flaws and inaccuracies. In the first place, no definite assign was appointed, nor was provision made for the administration of the fortune. The disposition, according to which the annual interest was to be employed for the most important discovery or invention made in each successive year, gave rise to apprehensions of serious difficulty in regard to practical execution.

The first thing to be done was clearly to establish the aims NOBEL had desired to realise in his testament, and in this regard there could be no room for doubt, in view both of the intimations of the testament itself and of the testimony of the witnesses thereto.

Meanwhile, numerous provisions had still to be made: the residual assets of NOBEL'S fortune had to be realised, the testamentary business to be settled, and the legacies to be defrayed. The realisation of a fortune located in eight different countries and invested in numerous enterprises proved highly complicated and wearisome; many knotty points had to be settled by lawsuits, nay, it was first of all a question of establishing in which country the testator had actually been resident, before it could be decided what laws were to govern his testamentary dispositions.

In the second place, before NOBEL'S intentions could be fulfilled, the conditions and manner of distributing the prizes had to be more precisely determined. For this purpose, Ragnar SOHLMAN and Rudolf LILLJEQUIST, the two men appointed by NOBEL as executors of his last will, called upon the Swedish Academy, the Academy of Sciences, the Carolinian Institution, and the Norwegian Storthing, the bodies to be entrusted with the distribution of the prizes, to accept the office which NOBEL had desired to transfer to them, and to nominate delegates for the requisite discussions. In 1897 and 1898 deliberations took place by which, after an exact formulation of the dispositions, and after various alterations and additions, albeit without any actual departure from the basic directives of the testament, it was finally found possible to arrive at the definite presumptions for a realisation of the NOBEL Foundation.

A suit filed by several of NOBEL'S heirs against the validity of the testament on the grounds of formal flaws was settled in 1898 by way of a compromise, so that discussions could finally ensue in regard to the statute itself; these deliberations were carried on in 1898 and 1899 by a committee consisting of the representatives of all the prize-distributing bodies and of the NOBEL family, as also of the two executors. The statute executed by this committee was confirmed and approved by the Royal Swedish Government on June 29th, 1900.

After the deduction of death duties, the total fortune of the Foundation amounted to rather more than 31 million Swedish kronor.

The villa at San Remo, together with its furniture, had been sold to a German business friend of Alfred NOBEL'S; the Björkborn laboratory continued to operate; NOBEL'S library, private files, and correspondence, and a number of interesting objects out of his laboratory were embodied in a "NOBEL Museum" administered by the NOBEL Foundation.

As from January 1st, 1901, the "Administration of the NOBEL Foundation" (Nobelstiftelsens Styrelse) elected by the authorised representatives undertook the management of the Foundation's funds.

By the "Statutes of the Nobel Foundation" all dispositions as to the form and manner of distributing the prizes were definitely set forth.

The idea embodied in the word "Literature" was interpreted as embracing not only belletristic works but also other writings, provided they possessed literary value in their form and contents. The stipulation that the prizes distributed were to be awarded for achievements that had been forthcoming "in the past twelvemonth" was taken to mean that primarily the prizes were to be awarded only for the latest results of work done in the cultural realms designated in the testament, while older achievements were only to benefit if their importance had but recently become apparent.

The prize of each of the five groups can be divided, or else allotted jointly to two prize-winners. Supposing none of the achievements entering into consideration is held to answer the demands of the testament, the prize may be retained for the following year, or else added to the funds of the respective group. The prize of each group must, however, be awarded at least once in every five years.

As appears from the testament, there are four Swedish prize groups (1. for physics, 2. for chemistry, 3. for physiology and medicine, and 4. for literature) and one Norwegian group (for the peace prize).

It was to worthy and very eminent bodies that NOBEL entrusted the office of annually distributing these five prizes:

the prizes for physics (1) and chemistry (2) are awarded by the venerable Royal Academy of Sciences (Kungl. Vetenskaps Akademien) at Stockholm, an institution under the direct patronage of the King of Sweden (called in NOBEL'S testament the "Swedish Academy of Sciences");

the prize for physiology and medicine (3) is conferred by the Royal Carolinian Medico-Surgical Institution at Stockholm, occupying the position of a sort of special medical university;

the literature prize (4) is awarded by the "Swedish Academy" (Svenska Akademien) at Stockholm, an institution similar to the French and Spanish academies, whose chief task, in the words of its founder, is that of "working for the purity and elevation of the Swedish language . . . and ensuring the maintenance and promotion of good taste." This body, too, is under the personal patronage of the King of Sweden;

the fifth prize finally, NOBEL'S special peace prize, is conferred by a particular committee elected by the Norwegian Storthing.

For each of the four Swedish prize groups the competent distributing body appoints a special "Nobel Committee", consisting of from three to five persons; similarly, the Norwegian Storthing elects for the peace prize a committee of five members with a functioning period of six years.

In support of the Nobel Committees for the purpose of examining the suggestions received, the distributing bodies have established special scientific institutions, known as "Nobel Institutions": in 1901 the Nobel Institution of the Swedish Academy with a library of its own, and in 1905 the Nobel Institution for Physical Chemistry, both of them at Stockholm.

The latter institution, created at the instigation of Svante ARRHENIUS, was furnished in 1909 with a special laboratory; since 1905 it has been publishing a series of scientific "Meddelanden" (reports), in which scientific writings by bearers of the Nobel Prize and other scholars find publication.

The Norwegian Nobel Institution at Oslo, founded in 1904, has since 1905 had its own statutes and premises. Its object, under the auspices of the Norwegian Nobel Committee, is that of supporting the work of the latter body and, in particular, of keeping track of inter-state relations, and of all endeavours for a peaceful solution of controversial questions. It likewise possesses a "peace library", collected according to the plans of Chr. L. LANGE and consisting of four sections: 1. peace endeavours, 2. international law and peace treaties, 3. history, and 4. social sciences; 1912 saw the publication of volume 1 of this library's catalogue ("Littérature pacifiste").

The task of the five Nobel Committees consists in examining the suggestions submitted to them, and expressing their opinion as to the prize allotment. The relative decisions are thereupon pronounced by the distributing bodies designated in the testament.

Suggestions can be accepted only from competent quarters; no personal application for the Nobel Prize is admissible. All suggestions, moreover, must be submitted in writing, substantiated in detail, and accompanied by the publications of the candidate proposed.

The following are the competent quarters for the submission of suggestions:

(1 & 2) for the physics and chemistry prizes:

the members of the Royal Academy of Sciences and of the Nobel Committee for Physics and Chemistry at Stockholm,

any such persons as have already been awarded the Nobel Prize of this group,

the professors of these subjects at the universities of Uppsala, Lund, Oslo, Copenhagen, and Helsingfors, at the Carolinian Medico-Surgical Institution and at the Polytechnic at Stockholm, and the teachers at the Stockholm College,

college professors and savants of other countries, in so far as they have been specially allowed the right of suggestion by the Stockholm Royal Academy of Sciences;

(3) for the prize in physiology and medicine:

the senators of the Carolinian Medico-Surgical Institution at Stockholm,

the members of the medical class in the Royal Academy of Sciences, any persons already in receipt of the Nobel Prize for physiology and medicine,

the professors of the medical faculties at the universities of Uppsala, Lund, Oslo, Copenhagen, and Helsingfors,

prominent teachers of these subjects at other colleges, if specially designated by the Senate of the Carolinian Institution;

(4) for the literature prize:

the members of the Swedish, French, and Spanish academies,

the members of humanistic classes at other academies or at institutions and societies of the same rank,

the teachers of aesthetics, literature, and history at university colleges;

(5) for the peace prize:

the members of the Nobel Committee of the Norwegian Storthing,

the members of Governments and National Assemblies,

the members of the Inter-Parliamentary Union, of the International Court of Arbitration at the Hague, of the Commission of the Permanent International Peace-Bureau, and of the Institution for International Law,

university professors of state science and jurisprudence, history and philosophy,

bearers of the Peace Prize.

One-tenth of the annual revenue of the Foundation is added to the capital sum; the balance remaining over after deduction of the administrative expenses is then divided into five equal portions to form the five Nobel prizes.

Each of these prizes may be valued at present at about £ 10,000.

The distribution of the prizes ensues annually on December 10th, the day of Alfred NOBEL'S death, the prizes for physics, chemistry, medicine, and literature being conferred at Stockholm, and the peace prize at Oslo.

I. The dignified ceremony at Stockholm is enacted in the great hall of the Royal Musical Academy, adorned for the occasion with a bust of NOBEL and with a wealth of flowers. The number of those invited comprises the King of Sweden and the members of the Royal Family with their suites, the members of the Swedish Cabinet, the Ministers of foreign countries and the members of the diplomatic corps, the members of the NOBEL family, the members of the Swedish

Riksdag, the principal executive functionaries of the Swedish Government and the metropolis, representatives of the colleges and of scientific and artistic societies, a great number of ladies of society and — any such persons as have already been awarded the Nobel Prize.

The arrival of the King is greeted with the strains of the Swedish national anthem. Thereupon the delegates of those bodies which are entrusted, according to NOBEL'S testament, with awarding the prizes proceed to fulfil their office: at intervals between musical performances on the part of the Royal Orchestra they announce the names of the laureates and hand them the respective prizes, diplomas, and gold Nobel medallions with a short address.

The ceremony closes with the chanting of the beautiful hymn in praise of Sweden "Du gàmla, du fria . . . ."

On the evening of the same day a banquet is given by the Nobel Foundation at the Grand Hotel at Stockholm. The Chairman of the Foundation first raises his glass in honour of the King. Then either the King himself or his representative invites those present to drink with him in silence to the memory of the great departed benefactor, Alfred NOBEL. Then it is the turn of the laureates themselves to render thanks for the honour done them. It is these toasts, half improvised and wholly born of the spirit of so solemn an occasion, that really do justice to the grandeur of the awards and of the august intention of their donor. Uttered at such a moment, the words of gratitude from the lips of those whose merits have met with so munificent a reward tend to unite their own efforts in the service of humanity with the high idealism of Alfred NOBEL.

II. The ceremony attending the conferring of the prize for peace by the Nobel Committee of the Norwegian Storthing takes place at Oslo at a sitting of the Storthing specially convoked for this purpose on December 10th. After an address by the President in honour of the occasion, the Nobel Committee announce their decision, which is embodied in the minutes of the Parliamentary sitting. The ceremony at Oslo is likewise most solemn and impressive.

If one to whom a prize has been allotted is prevented from attending in person, the prize destined for him is handed to the diplomatic chargé d'affaires of his country. Should the prize be declined, or should the money not be collected in due time, the amount falls to the main fund.

The **Nobel medallion** conferred by the four Swedish Nobel Committees is from the hand of the Swedish sculptor, Erik LINDBERG, while the Nobel medallion for the peace prize was fashioned by the Norwegian artist, Gustav VIGELAND. The front of each bears the likeness of NOBEL with his birth and death dates, while on the reverse the special object of the medallions is symbolically represented by groups of figures, surrounded in the case of the Swedish medallion by the quotation from Vergil's Æneid:

Inventas vitam juvat excoluisse per artes,

and in that of the Norwegian medallion by the motto:

Pro pace et fraternitate gentium.

Upon each medallion, moreover, the name of the recipient is engraved *).

In connection with the ceremony or shortly afterwards, the laureates are wont to deliver their "Nobel Lectures" (at Stockholm or Oslo, as the case may be), affording a generally comprehensible survey of their sphere of activity. These **Nobel Lectures** are published as an annexe to the annual publication "Les Prix Nobel".

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*) See Page 598, 599.

IV. THE NATIONALITY OF THE PRIZE-WINNERS

If we classify the bearers of the Nobel Prize according to their nationality, no difficulty at all arises in regard to the recipients of the prizes for Literature or for Peace. In the other three groups, meanwhile, i. e. physics, chemistry, and medicine, the matter is considerably more complicated, since so many of these scientists changed their abode or transferred the field of their activity once, if not oftener, in the course of their careers, when accepting a call to some foreign university. In the following statistics, therefore, we have in all cases taken that country into consideration in which the scientist in question had settled and was working at the time of the Nobel Prize award. From this standpoint it will be seen that Germany ranks first, followed in order by Great Britain, France, the United States and Sweden. In the Chemistry Prize statistics alone, Germany figures with 15 laureates; it also leads in the Physics Prize group with 10, and in regard to Medicine with 6 laureates. In Literature France comes first with 5¹/₂ prizes, while for the Peace Prize America leads with the same number. As the Peace Prize was thrice not conferred on single candidates but awarded to international institutions serving peace ideals, which was the case in 1904, 1910, and 1917, we have in these instances considered the seat of the respective institutions decisive in the sense of nationality. In this way Switzerland figures with 3¹/₂ prizes in the Peace-Prize statistics.

The Physics Prize was divided in 1902, 1909, 1915, 1925, 1927, 1933, 1936, and 1937, while in 1903 the one half was again halved. In 1916, 1931, and 1934 this prize was not conferred but added to the capital.

The Chemistry Prize was divided in 1912, 1929, 1931, 1935, and 1937, and added to the capital in 1916, 1917, 1919, 1924, and 1933.

The Prize for Medicine and Physiology was divided in 1906, 1908, 1922, 1923, 1929, 1932, 1934 (into 3 parts), and 1936, and added to the capital in 1915, 1916, 1917, 1918, 1921, and 1925.

The Literature Prize was divided in 1904 and 1917, and used for capital accretion in 1914, 1918, and 1935.

The Peace Prize, finally, was divided in 1901, 1902, 1907, 1908, 1909, 1911, 1921, 1925, 1926, 1927, and 1931, and retained to augment the capital in 1914, 1915, 1916, 1918, 1923, 1924, 1928, and 1932.

	Physics	Chemistry	Medicine & Physiology	Literature	Peace	Together
Germany	10	15	6	5	2	38
Great Britain	7½	5	3½	4	4½	24½
France	5	4	3½	5½	3½	21½
United States	3½	3	4	2	5½	18
Sweden	2	2½	1	3	2	10½
Switzerland	—	1½	1	1	3½	7
Denmark	1	—	3	1	1½	5½
Austria	½	1	2½	—	1½	5½
Holland	3	—	1½	—	½	5
Belgium	—	—	1	1	2½	4½
Norway	—	—	—	3	1½	4½
Italy	½	—	½	3	½	4½
India	1	—	—	1	—	2
Poland	—	—	—	2	—	2
Russia	—	—	1	1	—	2
Spain	—	—	½	1½	—	2
Canada	—	—	1	—	—	1
Argentina	—	—	—	—	1	1
Hungary	—	—	1	—	—	1
	34	32	31	34	30	161

As the Peace Prize for 1935 was awarded in 1936 to the German pacifist journalist Karl von OSSIETZKY, who at the time of the award was imprisoned in Germany on a charge of high treason, a great, international press campaign ensued against National-Socialist Germany. In consequence of this unpleasant newspaper confict a law was passed in Germany in 1937, forbidding German citizens henceforth to accept the Nobel Prize, to replace which a special German State Prize was instituted for the promotion of science and literature.

V. THE FINANCES OF THE NOBEL FOUNDATION

Immediately after Alfred Nobel's death the assets of the endowment figured, according to a rough balance-sheet drawn up at Bofors on October 30th, 1897, at 33,233.792 Swedish kronor, which sum was dispersed in various countries in the following way:

France	7,280.817
Germany	6,152.251
Sweden	5,796.140
Russia	5,232.774
Scotland	3,913.939
England	3,904.235
Italy	630.410
Austria	228.754
Norway	94.472
Total	33,233.792

By the year 1901, at which time the Nobel Prizes were distributed for the first time, this total had decreased to 27,716.243 Swedish kronor. An agreement had been reached with some of the other heirs, the death duties had been paid, the Nobel Institute erected, all of which cost the endowment more than 5 million Swedish kronor. At the present time the Foundation funds amount to about 45 million Swedish kronor, since the capital has been annually increased by one-tenth of the yield, besides which certain smaller legacies and endowments have been added to them. Apart from this, certain prizes were not conferred in various years but added to the principal.

The following is a list of the annually established prizes, arrived at by first deducting all taxes and overhead charges from the annual yield of the Foundation's capital and then adding to the capital one-tenth of the residual sum. What then remains over is the net yield of the endowment. Of this remainder, again, one-quarter is allotted to the individual sub-divisions, and three-quarters are distributed in five equal parts in the form of Nobel Prizes. Thus each recipient of a Nobel Prize, provided the latter is not divided, received the amount indicated below.

	Swedish kronor		Swedish kronor
1901	150.782	1919	133.128
1902	141.847	1920	134.100
1903	141.358	1921	121.573
1904	140.859	1922	122.483
1905	138.089	1923	114.935
1906	138.536	1924	116.719
1907	138.796	1925	118.165
1908	139.800	1926	116.960
1909	139.800	1927	126.501
1910	140.703	1928	156.939
1911	140.695	1929	172.760
1912	140.476	1930	172.947
1913	143.011	1931	173.206
1914	146.900	1932	171.753
1915	149.223	1933	170.332
1916	131.793	1934	162.608
1917	133.823	1935	159.917
1918	138.198	1936	159.850
1937	158.463		

PART TWO

BIOGRAPHY
OF
PRIZE-WINNERS

I.

BEARERS OF THE PRIZE FOR PHYSICS

NOBEL PRIZE for 1901

WILHELM KONRAD RÖNTGEN

First on the roll of Nobel Prize bearers for Physics stands the name of a German physicist, a name well known to one and all, representing as it does a discovery now employed all the world over, the name of Wilhelm Konrad RÖNTGEN.

RÖNTGEN was born on March 27th, 1847, at Lennep in Rhenish Prussia, quite close to the Dutch frontier. Destined originally for a technical career, he studied at the polytechnics of Utrecht and Zurich. At the latter seat of learning he was induced by his teacher, KUNDT, to abandon practical technical studies in favour of pure science; he thus took his degree as "doctor philosophiæ" at Zurich in 1869 and became KUNDT'S assistant, continuing as such at Würzburg, whither KUNDT soon repaired. In 1872, when his preceptor responded to a call to the newly established German university at Strassbourg, RÖNTGEN, though no longer his assistant, once more followed him, and in 1874 became a lecturer on physics. The very next year, however, he accepted a professorship at the agricultural college at Hohenheim, though only to return, one year later, as extraordinary professor to Strassbourg University and in 1879 as ordinary professor to Würzburg. Here he remained until the year 1900, when he removed to Munich, at the university of which town he continued to lecture until his death on February 10th, 1923.

The epoch-making discovery of what are known as "X-rays", on which RÖNTGEN'S renown primarily rests, by no means represented the sum total of his life's work. Indeed, the other numerous results of his untiring research work are also of great significance in physical science. His main realms of study were thermology, mechanics, and electricity. In this connection we may mention his treatise on the absorption of warmth by steam, his absolutely accurate and correct establishment of the proportions of the specific heat of gases, executed according to the methods of CLEMENT and DESORMES, his studies on the thermo-electric, actino-electric, and piezo-electric properties of quartz, on the influence of pressure on the breaking conditions of various liquids, and on the magnetic rotation of polarised light. There is hardly a realm of physics to which RÖNTGEN did not contribute greater or smaller studies, many of which would command more general attention, were they not dwarfed by the overpowering importance of his main discovery. As is well known, the great significance of these newly-discovered rays, to which RÖNTGEN, after whom they were subsequently called, himself gave the name of X-rays, lies in their property of penetrating through many bodies that are absolutely impenetrable in regard to light, so that it is possible by means of them to detect extraneous bodies, such as bullets, needles, splinters, and the like, embedded in the muscular tissues of human beings or animals. This discovery, which RÖNTGEN made in 1895, therefore not only opened up entirely new paths and possibilities for modern experimental physics, but, above all, furnished practical medicine in general and surgery in particular with an invaluable instrument. The discovery was set forth in three treatises by RÖNTGEN, viz: "On a New Kind of Ray", first report, 1895; a second report, 1896, and "Further Observances Regarding X-Rays", 1897.

In the year 1901, when RÖNTGEN was awarded the first Nobel Prize for Physics "in recognition of the extraordinary merit gained by the discovery of the special rays bearing his name," the substantiation of the award concluded with the following words: "If, in addition, we consider that in numerous cases serious skin diseases, such as lupus, have been successfully treated by means of X-rays, we need not hesitate to declare that RÖNTGEN'S discovery has already so greatly benefited humanity as to make the conferring of the Nobel Prize in reward thereof appear entirely in accordance with the testator's intention."

NOBEL PRIZE for 1902

HENDRIK ANTOON LORENTZ

Hendrik Antoon LORENTZ was born at Arnhem, in the Netherlands, on July 18th, 1853. At Leyden University where, after the usual preparatory schooling, he completed his education, he graduated in philosophy in 1875. No more than three years later, when he was only twenty-five, the same university appointed him professor of mathematical physics. His scientific research work is set forth in a great number of important treatises and articles, published, during more than half a century (from 1875 till his death on February 4th, 1928), in Dutch periodicals and, in French, English, or German, in many foreign scientific publications. Collected by his disciples in the form of a comprehensive volume, they show his knowledge and activity to have been far from narrow or unilateral.

Starting from the theory of the reflection and refraction of light, a subject on which he had already aroused attention by his graduation dissertation, he established, in the year 1880, the respective relations existing between the refraction of light and the density or aggregate condition, whether gaseous or fluid, of a translucent body. Since, by a most remarkable coincidence, these relations were at the same time also discovered or recognised by the Danish physicist L. V. LORENZ, they have come to be known as the "Lorentz-Lorenz relations".

Fundamental studies by LORENTZ dealt with the matter of MAXWELL'S theory on electro-magnetic phenomena, which LORENTZ succeeded in supplementing most happily by his cognition of the electron, the infinitessimally small, electrically charged particle of an atom, the conception of which he was the first to introduce into theoretic physics. The electron theory, again, enabled him adequately to explain the magneto-optical effect or influence of a magnetic field on the spectral lines of light discovered by his pupil, Pieter ZEEMAN, and to find in it an undeniable confirmation of the entire hypothesis.

Modern theoretic physics, moreover, owes to him the theory of electro-magnetic phenomena in moving bodies, by which LORENTZ gave a great impetus to the development of latter-day physical science, entitling him to figure among its chief pioneers and leaders. And, in the last few years of his life, his untiring, speculative mind sought and found contact with the problems and methods of a younger generation, in particular by his theoretic studies on gravitation, and by conclusions running parallel with EINSTEIN'S theory of relativity. By establishing a new law of mechanics, based on what is known as the Lorentz transformation, he revolutionised theoretic physics from its very foundations, entailing thereby a change of opinions unequalled in the history of physics.

In 1912 LORENTZ retired from his university vocation, and was appointed to the directorship of the Teyler Laboratory at Haarlem, a position he occupied until his death.

Unassuming though his nature was, his work earned him a number of important distinctions: thus he became member of numerous academies, was awarded the Rumford Medal, and, in 1902, gained the Nobel Prize for Physics jointly with Pieter ZEEMAN, "in recognition of their extraordinary merit in investigating the influence of magnetism on the phenomena of radiation".

LORENTZ'S most important writings were: "La théorie électromagnétique de Maxwell et son application aux corps mouvants" (1892); „Versuch einer Theorie der elektrischen und optischen Erscheinungen in bewegten Körpern" (1895); his "Differential and Integral Calculus" (1882); "Visible and Invisible Movements" (1901), and the "Theory of Electrons" (1909).

PIETER ZEEMAN

Pieter ZEEMAN, awarded the Nobel Prize for Physics jointly with his countryman and academic preceptor, Professor H. A. LORENTZ, was born at Zonnemaire in the Netherlands on May 25th, 1865. He was the son of a clergyman. In the year 1885 he repaired to Leyden University, and devoted himself in particular to the study of physics under the tuition of LORENTZ and Heike KAMERLINGH ONNES; in 1890 he became assistant teacher at the Leyden Physical Institution, and in 1893 acquired the degree of Doctor of Philosophy, his treatise dealing with measurements on KERR'S magneto-optical phenomenon. This work already dealt with the reflection of light by magnets, being an abridged treatment of a study that had gained the prize of the Haarlem Society of Sciences. In the year 1894 ZEEMAN became a lecturer at Leyden University, whence he was transferred, as official lecturer, to Amsterdam University three years later. Here, in 1900, he was promoted to a professorship, followed by the position of a professor ordinarius in 1908, in which year he was also entrusted with the management of the Physical Institution.

Even in those early years his zealous research work centred round the relations between magnetism and the radiation of light, and thus it was that, in 1896, he succeeded in discovering the widening and multiplying of the spectral lines in the magnetic area. Most of his studies about this time are set forth in the records of the Netherland Academy of Sciences. As was pointed out by Professor Hjalmar THEÉL, President of the Royal Academy of Sciences at Stockholm, on the occasion of the Nobel Prize award, the magneto-optical phenomenon, which has come to be known as the "ZEEMAN Effect", constitutes for the physicist one of the most important experimental achievements within the last few decades. For the proof that light is influenced by the magnet according to the same laws as prevail for vibrating electric matter obviously not only furnishes the best confirmation of the electro-magnetic theory of light, but also promises, in its prospective further development, the most interesting contributions to a knowledge of the constitution of spectra and of the molecular construction of bodies."

In connection with the award of the Nobel Prize in 1902, jointly with his teacher LORENTZ, ZEEMAN dealt, in his "Nobel Lecture" before the Swedish Academy of Sciences at Stockholm in 1903, with the "Radiation of Light in the Magnetic Area", which concise but comprehensive treatment culminated in the following demonstration of the result obtained, and the prospects thereby opened up for science: "Electricity is forthcoming in thousands of places were its existence has for us hitherto been only a matter of conjecture. Innumerable electric particles vibrate in every flame and in every source of light; nay, we may assume that every source of warmth is filled with electrons, eternally vibrating without interruption. All these electrons impart their peculiarities to the emanating rays. We may rely upon it that the experimental study of the phenomena of radiation that are subject to various influences but in particular to that of magnetism, will furnish us with important material for the evolution of a new realm of study, that of atomistic astronomy, supplied with atoms and electrons in the place of planets and moons."

ZEEMAN'S later investigations mainly dealt with the question to what extent waves of light, radiated in flowing liquids, are conveyed by the current thus formed.

NOBEL PRIZE for 1903

HENRI BECQUEREL

Henri Antoine BECQUEREL, known throughout the world as the foremost pioneer in the world of radioactivity, was the son of Edmond BECQUEREL, Professor of Applied Physics, and the descendant of a family of eminent scholars. Born in Paris on December 15th, 1852, he graduated from the Polytechnic in 1885, and was appointed chief engineer in 1894; in 1888 he had acquired the degree of docteur-ès-sciences. As from 1878 he was employed as an assistant at the Paris Museum of Natural History, while at the same time frequently replacing his father in his chair at the "Conservatoire des Arts et Métiers"; in 1892 he was promoted professor at the Museum, besides which he was appointed professor at the "Ecole Polytechnique" in 1895.

His scientific activity began as far back as 1876 with studies on the magnetic rotation of the polarisation-plane of light, followed by investigations of atmospheric polarisation, of the influence of earth magnetism on the atmosphere, of the absorption of light by crystals, and similar matters. His doctor's dissertation in 1888 was submitted under the title of "Recherches sur l'absorption de la lumière". But all these studies, important as they were in themselves, were eclipsed by his discovery of radioactivity in the year 1896. BECQUEREL arrived at the conclusion that uranic salts emit a particular kind of invisible rays, possessing certain qualities in common with x-rays. They have become generally known as "Becquerel Rays", an expression chosen in his honour as a collective term for the α, β, and γ rays emitted by radioactive substances. It was in recognition of the extraordinary merit BECQUEREL had attained by his discovery of spontaneous radioactivity that, in the year 1903, he was awarded the Nobel Prize for Physics, jointly with M. and Mme. CURIE. The justice of this joint award, moreover, was subsequently confirmed by the fact that, by virtue of BECQUEREL'S discovery of radioactivity, Pierre and Marie CURIE were enabled, shortly afterwards, to isolate radium from the uranic mineral, pitchblende.

BECQUEREL'S most important works of this period were his "Découverte de la radioactivité et des rayons émis par l'uranium" (1896), "Interprétation applicable aux phénomènes de Faraday et de Zeeman" (1897), "Contribution à l'étude du phénomène de Zeeman" (written in collaboration with DESLANDRES in 1897), and finally his "Recherches sur la radioactivité" (1896—1904).

In the year 1900 he succeeded in demonstrating the electric deflectability of β rays. His research work in regard to the rays he had discovered was summed up in the Nobel Lecture delivered by him in 1903, under the title of "Sur une propriété nouvelle de la matière, la radio-activité".

BECQUEREL'S merit found recognition in various prominent distinctions: he was not only member of the "Académie des sciences" of Paris, but also, in succession to BERTHELOT, "sécrétaire perpétuel" of that body; besides this, he was corresponding member of numerous other academies and learned associations. In 1900 he was appointed Officer of the Legion of Honour.

He died at Le Croisic on August 25th, 1908.

PIERRE CURIE AND MARIE CURIE

Pierre CURIE was born in Paris on May 15th, 1859. He was the son af Dr. Eugène CURIE, a physician, and received his early education and training under the parental roof. Having studied at the Paris "Faculté des sciences," he became, in 1878, assistant teacher at the Physical Laboratory. In 1882 he was appointed "Chef des travaux pratiques" at the municipal "Ecole de physique et chimie industrielles" and in 1895 professor of physics at the same institution. In 1900 he was entrusted with a teachership at the "Faculté des sciences," and in 1904 promoted professor at that seat of learning, where a special chair was instituted in his favour.

Studies on the magnetic properties of bodies at various temperatures formed the subject of his doctor's dissertation in 1895.

Physical science owes to Pierre CURIE, above all, the important discovery that at certain temperatures, the so-called "Curie points", many bodies spasmodically change their magnetic properties.

In 1883, moreover, he succeeded in discovering the piezo-electricity of crystals, a phenomenon which he studied and described in collaboration with his brother, Jacques CURIE.

In 1898 he discovered, jointly with his wife, Marie CURIE, the radioactive elements of radium and polonium.

The year 1908 saw the publication of the "Oeuvres de Pierre Curie."

The award of the Nobel Prize for Physics to him and his wife Marie was "in recognition of the extraordinary merit they had acquired by their joint work on the phenomena of radiation discovered by Professor Henry Becquerel".

Pierre CURIE died in Paris on April 19th, 1906, from the results of a street accident.

Marie CURIE: v. as bearer of the Chemistry Prize for 1911.

NOBEL PRIZE for 1904

LORD RAYLEIGH

John William Strutt, 5rd Baron RAYLEIGH, one of the greatest physicists of recent times, was born at Langford Grove in Essex on November 12th, 1842. He studied at Cambridge, where he was senior wrangler, first Smith's Prizeman and, later, Fellow of Trinity College, after graduating M. A. in 1868. In view of his early prominence in the realm of physics, he was invited, on the demise of MAXWELL in 1879, to succeed him in the chair of experimental physics at Cambridge, a post he held until 1884. Three years later he went to London as successor to TYNDALL in the chair of natural philosophy in the Royal Institution, and chairman of the Davy-Faraday Research Laboratory.

Lord RAYLEIGH did an immense amount of work of the highest value, covering almost every branch of physics, perhaps the most important being his evaluation of the fundamental electric units, his valuable papers on optics and capillarity, on BOYLE'S law at low pressures, and in the realm of theoretic and experimental acoustics. His comprehensive knowledge enabled him frequently to approach the same natural processes from various standpoints.

To begin with it was the theory of sound that engaged his attention; he worked out a new method for measuring sound values and establishing the amplitude of sound-producing vibrations in the air. Both experimentally and theoretically he attempted to fix the limits of the audibility of sounds. Innumerable individual questions in this connection were dealt with collectively in his great two-volume "Theory of Sound" (1877—1878, 2nd edition 1894—1896), in which, first of all theoretically, he investigated all possible movements of sound-producing agents, such as strings, rods, discs, and membranes, and thereupon the movements of the air which these agents caused to vibrate.

In the course of his research he observed, in the year 1895, that in the ordinary nitrogen gained from atmospheric air the velocity of sound differed from that in nitrogen that was chemically developed. In view of RAMSAY'S contemporary establishment of the difference in the density of these two substances, RAYLEIGH'S success led to the discovery, by way of RAMSAY'S spectroscopic research, of those components of the air that were destined to become a matter of prime interest to science. The first to be defined among these chemically indifferent materials in the atmosphere was the "argon", detected jointly by the two British scientists.

The science of optics likewise owes to Lord RAYLEIGH achievements of lastings value. He sought to give practical expression to the problem of radiation by establishing a formula in this connection. He, furthermore, examined the validity of the law of reciprocity in the diffused rays of light, the interference of light emanating from molecules in motion, and the dispersion of light into infinitessimal particles. In this way he first recognised the polarisation conditions in the deflection of light in the very smallest particles and, by aid of this phenomenon, arrived at an explanation of the blue colour of the sky.

In the realms of magnetism and electricity, mention must be made of his research work regarding the spread of electro-magnetic waves in tubes and through small apertures. As to the problem of capillarity, he was able to attain results far in advance of the fundamental assumptions of LAPLACE.

Jointly with Arthur SCHUSTER, he participated in the international establishment of the "ohm" as a unit of electrical resistance.

Among the numerous distinctions awarded him during a lifetime rich in scientific achievements were the honorary degrees of D. C. L. at Oxford, LL. D. at Glasgow, Dublin, Edinburgh, and Birmingham, and D. Sc. at Dublin; at the coronation of King Edward VII. he received the Order of Merit. He was President of the Royal Society as from 1905 and Chancellor of Cambridge University from 1908. Outside the British Isles his eminence as a scientist found its worthiest recognition in the award of the Nobel Prize "for his inquiries into the density of the most important gases and his discovery of argon in connection with these inquiries".

His „Scientific Papers appeared in a collected form in four volumes in 1899—1903".

Lord RAYLEIGH, who had succeeded his father in the barony as early as 1873, died at Witham on June 30th, 1919.

PHILIPP LENARD

Philipp LENARD was born on June 7th, 1862, at Pozsony (Bratislava), which at that time belonged to Hungary. He studied physics at Budapest, Vienna, Berlin, and Heidelberg; at the last-named university he took his doctor's degree in philosophy in 1886. In 1893 he became a lecturer at Bonn University, whence he went as extraordinary professor to Breslau one year later, repairing in the same capacity to Aix-la-Chapelle in 1895. The next year, again, saw him ordinary professor of theoretic physics at Heidelberg. After another two years he followed a call to Kiel as professor of experimental physics, but in 1907 he returned to Heidelberg, where he still continues to lecture.

In his early works LENARD occupied himself with mechanical problems, such as the vibration of falling drops. At the same time he undertook the task of editing HERTZ'S "Prinzipien der Mechanik", after the death of that scientist (1894).

Subsequently, he turned his attention to work concerning the magnetism of wismuth and the phenomena of luminosity with special reference to that of pyrogallic acid, which he attributed to oxydation. Experiments regarding phosphorescence led him to recognize that phosphorescent substances, such as sulphuric calcium, will shine in the dark after exposure to light, only if they contain traces of heavy metals, but not in an entirely pure state.

LENARD'S main interest, meanwhile, was devoted to cathodic rays, the magnetic deflection and electrostatic properties of which he minutely studied. Importance also attaches to his inquiries into the photo-electric effect, which entailed the discovery that, contrary to former assumptions, the velocity of the electrons released by light is independent of the intensity of the radiation effecting such a release.

Prominent mention, moreover, must be made of LENARD'S speculatively theoretic work on the structure of atoms. He assumes atoms to be divisible, and to consist of yet smaller units, the so-called dynamids. LENARD'S dynamid theory greatly resembles RUTHERFORD'S subsequent theory of nuclear atoms, forming the basis of present-day atomic physics.

LENARD'S works have frequently been awarded prizes by English, French, and German academies, and he has been made a member of numerous learned societies. His Nobel Lecture was on the subject of "Cathodic Rays" (1905).

Among his more recent books, "Über Äther und Uräther" (1921) and "Quantitave über Kathodenstrahlen aller Geschwindigkeiten" (1925) have gained special prominence.

It was his fundamental research into the problem of cathodic rays that earned him the Nobel Prize.

NOBEL PRIZE for 1906

SIR JOSEPH JOHN THOMSON

Joseph John THOMSON was born at Cheetham Hall near Manchester on December 18th, 1856, and studied at Owens College, Manchester, and at Trinity College Cambridge, becoming a lecturer at the latter institute at the early age of twenty-seven, and Cavendish Professor of Physics only one year later. From 1905 to 1918 he held the professorship of physics at the Royal Institution for Natural Philosophy in London, where, in 1909, he became President of the British Association. From 1916 to 1920 he was President of the Royal Society.

At Cambridge THOMSON established an excellent experimental station uniquely equipped, and frequented by investigators from all parts of the world; here it was that he carried out his epoch-making inquiries into the discharge of electricity in gases and into chemical analysis with the aid of positive electric rays.

In 1880 he achieved the important theoretic discovery of the existence of an electro-magnetic mass appertaining to every electrically charged body. Further extremely significant investigations concerned the structure of atoms: for many years his atomic model played an important rôle in theoretic physics, though in 1913 it was superseded by that constructed by RUTHERFORD.

A matter to which he has paid particular attention is the discharge of electricity through gases, to which subject he devoted a great work as early as 1894. In 1911 his studies in this direction led him to a discovery of considerable value for the modern theory of atoms, viz. that of isotopy, in which connection he was able to demonstrate, by the example of the neons, that this gas, the atomic weight of which had been established at 20.2, was in fact a mixture of two different qualities of argon, which, though otherwise chemically identical, possess the respective atomic weights of 20 and 22.

Besides a great number of articles contributed to periodicals, he wrote the following works: "A Treatise on the Motion of Vortex Rings" (1883), "The Application of Dynamics to Physics and Chemistry" (1888), "Recent Researches in Electricity and Magnetism

(1893), "Elements of the Mathematical Theory of Electricity and Magnetism" (1895), "The Discharge of Electricity through Gases" (1898), "The Conduction of Electricity through Gases" (1903), "Electricity and Matter" (1904), "The Corpuscular Theory of Matter" (1907), "Rays and Positive Electricity and their Application to Chemical Analysis" (1913), and "The Atomic Theory" (1914).

In 1923, at the Franklin Institute of Philadelphia, he delivered five lectures on the electron, which appeared in print under the title of "The Electron in Chemistry".

Jointly with Professor J. H. POYNTING, he wrote "Properties of Matter" (1919) and other text-books on physics.

THOMSON was knighted in 1908; he has likewise been distinguished by the Order of Merit and by numerous scientific honours. Since 1918 he has been Master of Trinity College, Cambridge. The Nobel Prize was awarded him "in recognition of his merits for the theoretic and experimental study of the conduction of electricity through gases." His Nobel Lecture was entitled "Carriers of Negative Electricity."

ALBERT A. MICHELSON

Albert Abraham MICHELSON was born on December 19th, 1852, at Strelno in Posnania, at that time a province of Prussia. Repairing to the United States at an early age, he was educated at San Francisco, and in 1869 joined the American navy, in which, promoted ensign in 1873, he remained until 1881. During this time he taught physics and chemistry at various naval colleges, first at Annapolis, then in New York, and finally, as assistant to Professor NEWCOMB, at Washington. This activity constantly increased his scientific interest in physical problems and particularly in measurements of the velocity of light. With the limited apparatus of the navy-school laboratories he succeeded, moreover, in putting FOUCAULT'S pendulum experiment into execution. During a furlough trip to Europe in 1880 he completed his studies at the laboratories of HELMHOLTZ in Berlin, QUINCKE at Heidelberg, and CORNU, MASCART, and LIPPMANN in Paris. In 1881 he became teacher of physics at the Case School of Applied Science at Cleveland, Ohio, in 1889 professor at the Clark University at Worcester, Mass., and in 1892 professor and head of the physical institute of Chicago University.

MICHELSON'S first greater scientific work dealt with the exact measurements of the velocity of light. To this subject he also devoted subsequent works between 1925 and 1927, which finally led to the possibility of measuring light with a dregree of precision allowing for deviatons of no more than $^{1}/_{100,000}$th part of the measured value.

At the early age of twenty-eight MICHELSON won considerable fame by an experiment representing an answer to the question whether the rotation of the earth exercises an influence on the continuity of light. The negative outcome of the experiment executed by MICHELSON and his collaborators, it will be remembered, was subsequently one of the main props of the theory of relativity. In the twenties MICHELSON'S experiment was repeated under his personal guidance with a maximum degree of exactitude, the result being just as negative as on the former occasion.

Among his other achievements, great importance attaches to his exact measurements of the standard metre by spectroscopic means. This attempt originated in the very proper initial assumption that the wave-lengths of certain spectral lines were incomparably better suited for the standardisation of measures of length than was a prototype which, after all, might be subject to temporal alterations.

A method conceived by MICHELSON in the year 1923, rendering possible an absolute determination of the diameters of fixed stars by a brilliant exploitation of optical phenomena of interference, proved of the greatest value to astronomers, who thereby saw one of their dearest wishes fulfilled.

One of the signal writings from MICHELSON'S pen is that on "Light Waves and their Uses" (1903).

MICHELSON was a member of many academies and learned societies, and honorary doctor of several universities; in 1889 he was awarded the Rumford Medal, in 1900 the Grand Prix of the Paris World-Exhibition, in 1904 the Matteucci Medal of Rome, and in 1907 the Nobel Prize and the Copley Medal of the Royal Siciety of London.

In 1929 MICHELSON retired from the chair he had occupied at Chicago University and went to Pasadena for the purpose of pursuing his studies there.

The award of the Nobel Prize was "for his optical instruments of precision and the spectroscopic and metrological investigations he had executed with them."

He died on May 9th, 1931.

GABRIEL LIPPMANN

Gabriel LIPPMANN was born of French parents at Hollerich, in the Grandduchy of Luxemburg, on August 16th, 1845, and completed the studies he had commenced in Paris, under W. KÜHNE and KIRCHHOFF, at Heidelberg and HELMHOLTZ in Berlin, doing practical experimental work at both these seats of learning. As from 1883 he was a professor at the Paris Sorbonne, where he likewise conducted the physical laboratory.

To LIPPMANN we owe numerous works in various realms of physics. Already in Professor KÜHNE'S laboratory at Heidelberg he had occupied himself with electro-capillary phenomena; subsequent research in this direction led him to the construction of a capillary electrometer of extraordinary sensibility. Apart from electricity, it was thermo-dynamics, and optics, with special reference to photo-chemistry, that engaged his attention with most successful results. In the photographic realm his measuring and exposing method, which came to be known as the LIPPMANN interference process, created sensation and led him to the discovery of colour-photography. He initiated a novel kind of photographic plate, imitating in its construction the eye of an insect, and producing a negative without the use of a lens, the positive thereby showing a stereoscopic picture.

Other inventions of LIPPMANN'S are the cœlostat, this being a mirror rotating round an axis and, when adjusted to the polar line, permitting of a longer exposition of the sky for photographic purposes, as also the uranograph, constructed on similar lines.

The most important of LIPPMANN'S writings are his "Principe de la conservation de l'électricité" (1881), "Cours de thermodynamique" (edited by MATHIAS and RENAULT in 1888), "Leçons d'acoustique et d'optique" (1898), and "Unités électriques absolutes" (edited by BERGET in 1898).

His numerous treatises on photo-chemistry and colour-photography were published in French and German scientific periodicals and, in particular, in the "Comptes Rendus" of the Paris Academy.

LIPPMANN was a member of the Paris "Académie des sciences" and of the "Bureau des longitudes".

He was awarded the Nobel Prize "for his method, based on the interference phenomenon, of the photographic reproduction of colours."

He died on July 13th, 1921, on his way back from a visit to Canada.

NOBEL PRIZE for 1909

MARQUIS GUGLIELMO MARCONI

Guglielmo MARCONI was born on April 25th, 1874, at Griffone near Bologna; his father was Italian and his mother Irish. He studied at Bologna University, where he carried out his first attempts at wireless telegraphy, employing fritters and antennæ for the transmission of news by means of HERTZ'S electric waves. These experiments he then repeated with practical success in England, between Penarth and Weston, and finally, on a larger scale, for the Italian Admiralty at Spezia. In the year 1897 he founded the "Marconi Wireless Telegraph Company, Ltd." in London, through which, two years later, he established the wireless connection between England and France. The tremendous importance this invention was destined to attain in the interest of traffic and communications, both territorial and overseas, need hardly be underlined.

After the war MARCONI'S inception of short-wave transmitters marked a further signal step forwards in the improvement and expansion of his invention.

By his creation of broadcasting MARCONI not only placed at the service of mankind one of the greatest practical innovations; he also achieved thereby a salient, phenomenal invention of the very first order, constituting a milestone on the path of human cultural progress. By untiring and systematic research, and in logical pursuit of his problems, he succeeded in detecting one of the most mysterious secrets of nature, and in exploiting it for the practical advantage of humanity.

In the spring of 1930 his successful attempt to illumine the townhall of Sidney electrically from Genoa by means of wireless transmission created worldwide sensation.

In manifold ways modern technics have benefited by the practical application of his scientfic and experimental investigations. Not long before his decease MARCONI once more dumbfoundered his contemporaries by the announcement of his new system of "micro-radio", rendering possible both wireless telegraphy and wireless telephony and, in addition, revolutionising the nascent science of television. The ultra-short waves employed in this connection penetrate every obstacle and are impervious to disturbances, atmospheric or otherwise. Seeing that MARCONI'S micro-radio transmissions can be received only by those to whom they are addressed, their introduction will mark the end of a government monopoly in regard to telegraphs and telephones, for every one will in future be in a position to get into touch with anyone else without any intermediate switching on the part of official exchanges.

Countless public distinctions were conferred on MARCONI, inadequate as most of them must be to do justice to a man of such eminence. In England he was made Hon. G. C. V. O., while in Italy he was, *inter alia,* created a marquis and a member of the Senate.

The Nobel Prize for Physics was given to him, and at the same time to Professor Ferdinand BRAUN of Strassbourg, "in recognition of their services in the development of wireless telegraphy."

MARCONI died on July 20th, 1937, deeply mourned not only in Italy but throughout the civilised world. In his native country his birthday, April 25th, has been made a national holiday.

NOBEL PRIZE for 1909

FERDINAND BRAUN

Carl Ferdinand BRAUN was born at Fulda, in Hesse, on June 6th, 1850, and studied at the universities of Marburg and Berlin, graduating doctor of philosophy in 1872. After acting for two years as assistant to Professor QUINCKE at Würzburg, he proceeded to Leipsic, and again two years later returned to Marburg University in the character of professor extraordinary of theoretic physics. In 1880 he removed to Strassbourg, whence he was summoned to Carlsruhe in 1883 to a professorship at the Polytechnic, but in 1885, after a brief stay at Tübingen, where, however, he erected the new Physical Institute, he definitely returned to Strassbourg, the Physical Institute of which seat of learning he was appointed to conduct.

His graduation dissertation had dealt with the vibrations of elastic rods and strings, and for some time after this his investigations centred mainly on the influence of the amplitude and environment of such rods upon their vibrations. The science of thermo-dynamics, meanwhile, was promoted by his research work regarding the influence of pressure upon the solubility of solid bodies.

The principal field, however, both of his later work and of the success he was destined to attain, was the science of electricity. Apart from theoretic treatises on the KELVIN-HELMHOLTZ calculation of the electro-motoric force of reversible galvanic elements from thermal sources, on deviations from OHM'S law, and similar matters, it was in particular to practical experimental results that he owed his fame. Thus he constructed what has come to be known as BRAUN'S electrometer, and invented the special tube that thenceforth bore his name, a cathodic-ray tube for the purpose of investigating the form of electric oscillations.

In the year 1898 he extended his research to the realm of wireless telegraphy, first of all by attempts at transmitting Morsé signals through water by means of high-frequency currents; thereupon he introduced the closed circuit of oscillation into wireless telegraphy, and was one of the first to send electric waves in definite directions. In

1902 he succeeded in the reception of definitely directed messages by means of obliquely inclined antennæ.

A comprehensive record of his work on wireless telegraphy was published by BRAUN at Leipsic in 1901 under the title of "Drahtlose Telegraphie durch Wasser und Luft". (Wirless Telegraphy Through Water And Air.)

For his achievements in the realm of wireless telegraphy he was awarded the Nobel Prize for Physics in 1909 jointly with Guglielmo MARCONI. In this connection, he delivered a lecture on "Electric Oscillations and Wireless Telegraphy" (published in "Les Prix Nobel en 1909").

BRAUN died on April 20th, 1918, in New York, in which city he had been detained for several years by reason of the war.

NOBEL PRIZE for 1910

JOHANNES DIDERIK VAN DER WAALS

VAN DER WAALS was born at Leyden in Holland on November 23rd, 1837, studied at the university of his native town, and subsequently taught physics at secondary schools at Deventer and the Hague.

The year 1873 saw the appearance of his first scientific work, "On the Continuity of the Gaseous and Fluid Condition", which earned him his degree as doctor of philosophy. In 1877 he was appointed professor of physics at Amsterdam University, where he continued lecturing until his retirement in 1907.

Already in his maiden work mentioned above, which was soon after translated into German, French, and English, VAN DER WAALS arrived at the important recognition that the gaseous and the fluid aggregate conditions are continually merging in each other, so that there is no possibility of establishing an essential demarcation between them. By associating the thermo-dynamic theory of capillarity with the kinetic theory of gases, he arrived at the conclusion of continuity.

Proceeding from this point, he put forward an equation of condition which, uniformly valid for both fluids and gases, established the inter-connection of pressure, volume, and temperature, an achievement which proved fruitful in various respects, and corresponded entirely with ANDRESS' experimental observations in regard to carbonic acid. In the further pursuance of this line of research, VAN DER WAALS attempted to attain an equation of condition independent of the special nature of substances. This led him, in 1880, to the utterance of his law on corresponding conditions, which he set forth in the proceedings of the Royal Dutch Academy of Sciences at Amsterdam.

In 1890, furthermore, VAN DER WAALS succeeded in explaining the binary and ternary mixtures with the aid of his equation of conditions and in perfecting the thermo-dynamic theory of capillarity.

The Nobel Prize for 1910 was conferred on him "for his work in regard to the equation of conditions of gases and fluids."

His Nobel Lecture in the same year contained a generally comprehensible, short delineation of the problems he had so essentially helped to promote.

His very numerous scientific treatises found publication in the relative periodicals and, in particular, in the proceedings of the Royal Dutch Academy of Sciences at Amsterdam; many of his articles were likewise translated into English.

VAN DER WAALS died at Amsterdam at an advaneced age on March 9th, 1923.

WILHELM WIEN

Wilhelm WIEN was born on January 13th, 1864, on his father's estate at Geffken near Fischhausen, East Prussia. Bred in the country, he retained throughout life a predilection for agricultural activities, the more so as the poor health of his father forced him to assist in farming the estate of Drachenstein near Rastenburg, whither the family had removed in 1866. After completing his grammar-school curriculum at Rastenburg and Königsberg, he studied mathematics and nature-science at the universities of Göttingen, Berlin, and Heidelberg; meanwhile, as a pupil of HELMHOLTZ at that teacher's Physical Institute in Berlin, he already commenced scientific work on his own account with an experimental "Investigation into the Phenomena of Absorption Apparent in the Flection of Light", on the strength of which study he was promoted doctor of philosophy in 1886.

During his subsequent four years of farming the parental estate at Drachenstein he found leisure and energy for scientific work, and in 1887 published a treatise, "On the Transparency of Metals in regard to Light and Heat". In 1890 the estate was sold and the family repaired to Charlottenburg, where the youthful scientist could again devote himself fully to his studies, aided and encouraged by an appointment to assist HELMHOLTZ at the "Physikalisch-technische Reichsanstalt" conducted by the latter. Here he collaborated with O. LUMMER and L. HOLBORN in theoretic and experimental investigations on the law of heat-radiation and in attempts at measuring high and low temperatures. In 1892 he became lecturer at Berlin University on the strength of a treatise on the localisation of energy; four years later he was summoned as extraordinary professor to the Polytechnic at Aix-la-Chapelle; thence he proceeded, in 1899, as ordinary professor to Göttingen University, and the very next year he was appointed RÖNTGEN'S successor at Würzburg.

In addition to constant research work in connection with the theory of rays and minor hydro-dynamic investigations, he produced, while still at Aix-la-Chapelle, various studies on cathodic and canal rays, a line of research in which he was destined to do eminent pioneer work after his removal to Würzburg. In a treatise published in 1896 he had attempted to deduce a formula for the spectral distribution of the thermal radiation of a dark body, a result which, it is true, was subsequently improved on and generalised by PLANCK. Uneclipsed value, meanwhile, has continued to attach to his famous "Law of Alterable Distribution", deduced in 1893, according to which spectral distribution is connected with the temperature of radiation.

It was these investigations into the laws of heat-radiation that entailed the award of the Nobel Prize in 1911.

Declining various flattering invitations to Berlin and Leipsic, WIEN remained at Würzburg until 1920, when he answered a call to the university of Munich, again in succession to RÖNTGEN. Here he continued to develop the results he had attained in regard to the phenomena of light-radiation by atoms illumined in accumulated canal rays, in which respect the fundamental outcome of his research promised, in view of his untiring zeal and seemingly inexhaustible ingenuity, to lead to discoveries of yet greater significance. On August 31st, 1928, however, he died after a short illness, before he could complete his valuable work in this direction.

In the last few years of his life WIEN was likewise engaged in compiling, on broad lines, a manual of experimental physics, for which he succeeded in securing the collaboration of many eminent men both in Germany and abroad.

GUSTAF DALÉN

Nils Gustaf DALÉN was born on November 30th, 1869, at Stenstorp, Skaraborgs Län (Westergötland), Sweden. Already in his childhood he evinced keen interest in mechanics and an aptitude to invent small improvements in mechanical things. The son of a farm hand, it was intended that he should be trained for farming, gardening, and dairywork, but his natural bent for engineering and physics was so powerful that, after a period of private preparation, in great part auto-didactic, he was able in 1892 to attend the Chalmer Polytechnic at Göteborg, whence he graduated four years later as a civil enginner, repairing, for the completion of his studies, for one year to the Federal Polytechnic at Zurich.

Through his co-operation in the firm of "Dalén & Celsing (1900 to 1905), which had set itself the task of exploiting technical inventions, he contracted with the Swedish Carbide and Acetylene Company, for which he acted for two years as works-manager, and in whose service he did much of his most successful work. In 1906 he became chief engineer of the Swedish Gas-Accumulator Company, which soon attained a position of worldwide importance, thanks to his inventions and improvements. Appointed general manager of this concern in 1909, DALÉN had the misfortune, three years later, to lose his eyesight in consequence of a terrible explosion in the company's works, at the same time sustaining other bodily injuries from which he but slowly recovered. In spite of this catastrophic set-back, however, he has since then continued to work in the interests of science with a fortitude worthy of the highest admiration.

DALÉN'S first notable inventions included a hot-air turbine, various compressors and air-pumps, an apparatus for pasteurisation, an ingenious milking-machine, and numerous improvements in contrivances already in existence; later on he invented an automatic gas-igniter, by means of which gas is lit by a small rod that is irradiated in daylight but cooled on the approach of twilight. This so-called "sunshine valve" is in considerable use in coast-lighting. In general, it is to the improved employment of DISSOUS'S gas that DALÉN has devoted his efforts and ingenuity.

The award of the Nobel Prize in 1912, immediately after the accident by which the gallant inventor had been victimised, was mainly in view of his work in the interests of coast-lighting. The patent of conferment makes special mention of "the invention of self-acting regulators which, in combination with gas accumulators, serve the purpose of illumining lighthouses and lightbuoys."

Nils Gustaf DALÉN lives at Stockholm.

HEIKE KAMERLINGH ONNES

Heike KAMERLINGH ONNES was born at Groningen in Holland on September 21st, 1853. At first he attended the university of his native town, but later on also that of Heidelberg, where he studied from 1871 to 1873 under KIRCHHOFF and BUNSEN. In 1879 he graduated doctor of philosophy at Groningen with a remarkable dissertation on "New Proofs of the Rotation of the Earth"; in which, *inter alia*, he declared that every physical theory must be based on experiments of the greatest possible precision, a maxim he adhered to throughout his later life. As from 1878, he was assistant at the Delft Polytechnic, where in 1881 he lectured as deputy to Professor BOSSCHA. This led, in the following year, to his appointment as ordinary professor of experimental physics at Leyden University, a chair he continued to occupy until his death in 1926.

KAMERLINGH ONNES was most powerfully influenced by the teachings of two other Dutch physicists, both of whom were likewise distinguished in later years by the award of the Nobel Prize; these were VAN DER WAALS and LORENTZ. A treatise on the kinetic theory in regard to the fluid aggregate condition first attracted him to that realm of science in which he was to achieve his greatest success: the attempts of CALLIETET and PICTET at the liquefaction of gases, for which the achievement of low temperatures, was an essential presumption, awakened in him the idea of creating a special laboratory for the study of physical properties at low temperatures. The first plans and intimations in this regard were published by him in 1894 in an article, "On the Kryogene Laboratory". Himself endowed with exceptional gifts of organisation and with a spirit of great perseverance, he trained a staff of collaborators, including glass blowers and mechanics, with whose aid he was able to realise his far-reaching plans and to establish an excellently organised "low-temperature institute". Here he produced degrees of cold temperature approaching to one degree of the absolute freezing-point, thus enabling him to liquefy not only hydrogen but, in the year 1908, also helium.

These investigations showed that many physical phenomena and even certain constants are liable to change completely at such low temperatures.

Special importance attaches in this connection to the remarkable phenomenon of "supra-conduct", discoverend by KAMERLINGH ONNES'S low temperature tests but admittedly not yet fully explained by theory; it consists in the peculiar property, possessed by certain metals, of almost entirely losing their electric resistance at low temperatures. This result he succeeded in attaining, e. g., in the case of cadmium and lead, which latter will, at a temperature of 4 absolute degrees, for several days retain an electric current produced in a ring by a single induction.

These achievements in the interests of modern physics, which earned him the Nobel Prize for 1913 were by no means the sum total of KAMERLINGH ONNES'S activity: indeed, in almost all realms of physical science, with special reference to thermo-dynamics, magneto-optics, and the law of radio-activity, he did instructive and progressive work.

His Nobel Lecture furnished a generally comprehensible demonstration of the properties of bodies at low temperatures, also showing how the learned investigator had arrived at his production of fluid helium.

During the World War and in the early post-war years, KAMERLINGH ONNES did much towards mitigating and reconciling political differences in the world of science; while, in particular, his philanthropic humanity and kindness found utterance in praiseworthy efforts to succour the starving children in all countries suffering from food shortage.

He died on February 21st, 1926, honoured by all scientists and especially lamented by his pupils, enthusiastic admirers alike of his personal charm and of his gifts as a teacher.

MAX VON LAUE

Max von LAUE was born on October 9th, 1879, at Pfaffendorf, near Coblentz, on the Rhine. The son of a Prussian military official, whose employment necessitated a frequent transference within the kingdom, the boy lived in succession at Brandenburg on the Havel, at Altona, at Poznan, in Berlin, and finally at Strassbourg, where his teacher, Professor GÖRING, induced him to embark on a scientific career. This he commenced at Strassbourg University, but he soon removed to Göttingen, where he studied under VOIGT and ABRAHAM, and subsequently to Munic and Berlin. It was PLANCK'S lectures in Berlin that determined LAUE'S special line of research.

His graduation thesis, in 1903, dealt with "Interference Phenomena in Plates with Parallel Planes". He again repaired to Göttingen, but in 1906 became assistant to PLANCK at Berlin University, starting with a treatise on the thermo-dynamics of interference phenomena. Two years later he went as lecturer to Munich, but in 1912 accepted a professorship at Zurich. Returning to Germany upon the outbreak of the war, he was professor at Frankfort on Main in 1914, and in 1919 removed to Berlin, where he has since been professor of theoretic physics.

The discovery that made LAUE'S name famous throughout the scientific world was that of the interference of X-rays in crystals. Physicists had, it is true, ample reason to suppose that the wave-length of X-rays must be about one-thousand times smaller than that of visible light, but there seemed practically no hope of their ever really being able to measure wave-lengths, seeing that the construction of sufficiently fine grids, such as this would require, appeared technically altogether unfeasible. It was LAUE'S idea to use, in place of artificial grids, those which nature itself supplied in the form of crystals; thus he succeeded in establishing in crystals diffraction phenomena of X-rays, and thereby also in rendering possible an exact determination of the wave-lengths of these rays, which until then had defied all definition. At the same time, however, he succeeded in laying the foundation for the study of the internal structure of crystals.

Much attention was also aroused by LAUE'S book, "Das Relativitätsprinzip", which appeared in 1911, when he was still lecturing at Munich; it ran through many editions and was published again, with additions, in two volumes in 1921 under the title of "Die Relativitätstheorie". It has been translated into French.

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In a lecture at the Kiel "Autumn Week" in 1921 his subject was "The Physical Aspect of the World"; together with P. S. EPSTEIN, he compiled the article on "wave-optics" for the „Enzyklopädie der mathematischen Wissenschaften".

LAUE is honorary doctor of the medical faculty of Bonn University and member of the Berlin Academy of Sciences and of other learned bodies.

The Physics Prize of the Nobel Endowment was awarded him "for his discovery of the diffraction of X-rays in crystals", on which subject he furnished exact data in his Nobel Lecture at Stockholm, published in 1920. Max von LAUE lives in Berlin.

SIR WILLIAM HENRY BRAGG

Sir William Henry BRAGG, now Fullerian Professor of Chemistry at the Royal Institution of Great Britain, and director of the Davy-Faraday Research Laboratory, was born at Westward, Cumberland, on July 2nd, 1862, and studied mathematics at Trinity College, Cambridge, and physics at the Cavendish Laboratory there. In 1885 he was appointed professor of physics and mathematics at the university of Adelaide, South Australia, where he stayed until 1908. He then lectured at Leeds University until 1915 as professor of physics, and has since acted in the same capacity at University College, London.

His keen interest was first of all aroused by the study of electrons, at that time a new line of research; various writings of his on this subject were later collected under the title of "Studies in Radio-Activity". In 1912 he turned his attention to LAUE'S epoch-making discovery in regard to the interference of X-rays in crystals, which, in collaboration with his son, William Lawrence BRAGG, he started investigating most thoroughly. In this connection he succeeded in developing new methods, which not only permitted of measuring the wave-length of X-rays, but also embodied new observations as to the structure of crystals, leading to the discovery of an exact method of the spectroscopy of X-rays, the so-called "crystal method". The main results of this research work, together with a general description, were summed up in "X-rays and Crystal Structure", compiled jointly by father and son; it has already run through numerous editions and is, by reason of its clarity of delineation, regarded by scientists as a work of classic significance.

This joint, fertile work on the part of the two investigators found its reward in the joint conferment upon them, in 1915, of the Nobel Prize for Physics, "for their merits in the study of crystal structure by means of X-rays."

His principal lectures, delivered to a wider public, were in 1928 collected in book form as "An Introduction to Crystal Analysis."

In co-operation with William Lawrence BRAGG, Sir William likewise published "The Reflexion of X-rays by Crystals".

William Henry BRAGG, who was knighted by King George V., was, in 1930, awarded the Franklin Medal and the Coply Medal of the Royal Society. He has lectured, as a guest, at the universities of Baltimore, New York, and Princeton.

WILLIAM LAWRENCE BRAGG

William Lawrence BRAGG, awarded the Nobel Prize jointly with his father, Sir William Henry BRAGG, was born on March 31st, 1890, at Adelaide, South Australia, where his father held a university appointment. In 1909 the family returned to England, and William Lawrence, who had already graduated with honours in mathematics at Adelaide, studied physics at Trinity College, Cambridge, of which college he became Fellow in 1914. He had barely taken his Cambridge degree when he joined his father in investigating LAUE'S phenomena, publishing his first contribution to this subject in 1912 in the "Proceedings" of the Cambridge Philosophical Society. After working for a year as lecturer in natural science he was engaged during the war on sound ranging in the map section at army head-quarters in France.

So intimately was William Lawrence BRAGG associated with his father's experimental investigations in the matter of X-rays and the structure of crystals that in 1915, though no more than twenty-five years old at the time, he was considered worthy of sharing in the distinction accorded Sir William by the conferment of the Nobel Prize for Physics. In subsequent years, his untiring research has enabled him to establish the structure of a great number of crystals, including isomorphic alkali halogenides. In his work he has made great use of the X-ray spectrometer indicated by his father.

Since 1919 he has been Longworthy Professor of Physics in the Victoria University of Manchester. He is Fellow of the Royal Society.

CHARLES GLOVER BARKLA

Charles Glover BARKLA was born at Widness in Lancashire on June 7th, 1877; he studied at University College, Liverpool, where he devoted himself in particular to physics and mathematics.

At J. J. THOMSON'S Cavendish Laboratory, Trinity College, Cambridge, BARKLA started, in 1899, to investigate the velocity of electric waves in wires. In 1905 his efforts were rewarded by the very remarkable discovery of what is known as "self-radiation". This means that metals that have been subjected to X-rays contain, in their own subsequent, secondary radiation, rays of quite a definite degree of hardness, which "self-rays" are therefore just as characteristic of the respective chemical basic materials as are their optical spectra. He furthermore succeeded in ascertaining, in regard to most of the metals he investigated, two different sorts of rays, viz. harder K-rays and softer L-rays, and was also able to establish that the hardness of rays increases with the growth of their atomic weight.

BARKLA'S investigations form the foundation on which, a few years later, X-ray spectroscopy could be developed. (BARKLA'S countryman, MOSELEY, the initiator of this further highly significant fact, might himself have participated deservingly in the award of the Nobel Prize, had he not, shortly after his discovery, met a hero's death on Gallipoli.)

A comprehensive survey of these scientific results was afforded by BARKLA'S book, "Status of Research in regard to Secondary X-Radiation", which appeared in 1908.

Other scientific problems with which BARKLA has successfully dealt are the ionisation of X-rays and its photographic effects, as also the phenomena of fluorescence.

Numerous scientific distinctions were conferred on BARKLA: the Solvay International Institute of Brussels awarded him a prize in 1912; in the following year he was invited by the „Deutsche Physikalische Gesellschaft" to lecture in Vienna at a meeting of German naturalists and physicians; in 1917 the Hughes Medal of the Royal

Society was conferred upon him, and in the same year the Nobel Prize for Physics, "for the discovery of the X-radiations peculiar to individual elements."

NOBEL PRIZE for 1918

MAX VON PLANCK

Max von PLANCK, born at Kiel on April 23rd, 1858, was the son of Julius Wilhelm von PLANCK, an eminent teacher of law. He studied physics and mathematics at Munich and Berlin, where his choise of studies was determined mainly by CLAUSIUS'S treatises. In 1879 he took his doctor's degree in philosophy at Munich with a dissertation on the second main clause of the theory of heat, and in the following year became lecturer in physics at the same university.

Five years later he was appointed extraordinary professor at the university of his native town, whence, upon the demise of KIRCHHOFF in 1889, he was summoned to fill that scientist's chair at the newly-founded institute for theoretic physics of Berlin University. Here, having advanced to a full professorship in 1892, he remained until the year 1928.

Meanwhile, the Prussian Academy of Sciences had in 1894 enrolled him among its ordinary members, and in 1912 made him its permanent secretary.

PLANCK has greatly enriched modern physical science by his extraordinarily fertile genius, and in particular by his famous "doctrine of elemental quanta", established in the year 1900. This hypothesis, introducing to physics a new fundamental and universal constant, not only provided the general formula, long sought in vain, for the spectral distribution of heat radiation by way of the "law of radiation" that bears his name; it soon afterwards proved of great value in regard to the problem of the specific heat of solid bodies, in explaining the effect of light-electricity, and in many other phenomena of electric science. It throws light on the constructive law of the periodical system of elements, and lays the foundation for a future astronomy of atoms.

The new direction in physical research founded by PLANCK'S ideas led, in 1913, to BOHR'S "quantum theory of atoms", which bore out the essential theories initiated by PLANCK.

Physical science, meanwhile, also owes pioneer work of great significance to Max von PLANCK in the realm of thermo-dynamics. At an early stage in his investigations PLANCK had turned his special attention to the phenomena of diluted solutions, in which respect, as also subsequently in regard to the problems raised by NERNST'S doctrine of heat, he furnished many valuable explanations and, in many instances, also opened up new channels of research.

A wide distribution was accorded PLANCK'S excellent manuals on the various branches of theoretic physics, which, based on his lectures, went through numerous editions. Mention should also be made of his early work on "The Principle of Maintained Energy", which appeared in 1887, earned him a prize at Göttingen University, and was reprinted many times.

PLANCK was awarded the Nobel Prize for Physics in 1918, "in recognition of the merit he had attained for the development of physical science by his discovery of the elemental quantum."

In 1930 he was elected President of the „Berlin Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften", a post he occupied until 1933.

JOHANNES STARK

Johannes STARK was born on April 15th, 1874, at Schickenhof in the Upper Palatinate, Bavaria, and studied chemistry, crystallography, and mathematics at Munich University, at the Physical Institute of which seat of learning he soon after became assistant. In 1900 he became lecturer in physics at the University of Göttingen, in 1906 professor extraordinary at the Polytechnic of Hanover, and in 1909 professor at the Polytechnic of Aix-la-Chapelle, where he continued to lecture until 1917. In that year he followed a call to the University of Göttingen, and in 1920 to that of Würzburg, finally retiring in 1922.

STARK is one of the most eminent experimental physicists of the present day. The two discoveries that have made his name famous are the establishment of the DOPPLER effect in canal rays and that of the splitting of spectral lines in the electric field, a discovery that constituted a victory over tremendous experimental difficulties.

The so-called STARK effect, as the electric splitting of spectral lines is now generally called, proved a brilliant confirmation of the modern quantum theory of atoms. The wonderfully precise accordances, devoid of all fractional results, that characterise the new theory of atoms, nowhere else appear in such beautiful completeness as in the case of STARK'S effect.

In the twenties STARK did eminently valuable speculative work in regard to the nature of chemical forces and to problems of atomic and molecular structure. In part, his ideas in this respect have been set forth in his three-volume book, „Prinzipien der Atomdynamik".

In the year 1904 he founded the „Jahrbuch der Radioaktivität und Elektronik", which he edited himself until 1919.

STARK at present holds the office of President of the „Deutsche Forschungsgemeinschaft" (formerly known as the „Notgemeinschaft der deutschen Wissenschaft").

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WILLIAM LAWRENCE BRAGG

William Lawrence BRAGG, awarded the Nobel Prize jointly with his father, Sir William Henry BRAGG, was born on March 31st, 1890, at Adelaide, South Australia, where his father held a university appointment. In 1909 the family returned to England, and William Lawrence, who had already graduated with honours in mathematics at Adelaide, studied physics at Trinity College, Cambridge, of which college he became Fellow in 1914. He had barely taken his Cambridge degree when he joined his father in investigating LAUE'S phenomena, publishing his first contribution to this subject in 1912 in the "Proceedings" of the Cambridge Philosophical Society. After working for a year as lecturer in natural science he was engaged during the war on sound ranging in the map section at army head-quarters in France.

So intimately was William Lawrence BRAGG associated with his father's experimental investigations in the matter of X-rays and the structure of crystals that in 1915, though no more than twenty-five years old at the time, he was considered wòrthy of sharing in the distinction accorded Sir William by the conferment of the Nobel Prize for Physics. In subsequent years, his untiring research has enabled him to establish the structure of a great number of crystals, including isomorphic alkali halogenides. In his work he has made great use of the X-ray spectrometer indicated by his father.

Since 1919 he has been Longworthy Professor of Physics in the Victoria University of Manchester. He is Fellow of the Royal Society.

NOBEL PRIZE for 1917

CHARLES GLOVER BARKLA

Charles Glover BARKLA was born at Widness in Lancashire on June 7th, 1877; he studied at University College, Liverpool, where he devoted himself in particular to physics and mathematics.

At J. J. THOMSON'S Cavendish Laboratory, Trinity College, Cambridge, BARKLA started, in 1899, to investigate the velocity of electric waves in wires. In 1905 his efforts were rewarded by the very remarkable discovery of what is known as "self-radiation". This means that metals that have been subjected to X-rays contain, in their own subsequent, secondary radiation, rays of quite a definite degree of hardness, which "self-rays" are therefore just as characteristic of the respective chemical basic materials as are their optical spectra. He furthermore succeeded in ascertaining, in regard to most of the metals he investigated, two different sorts of rays, viz. harder K-rays and softer L-rays, and was also able to establish that the hardness of rays increases with the growth of their atomic weight.

BARKLA'S investigations form the foundation on which, a few years later, X-ray spectroscopy could be developed. (BARKLA'S countryman, MOSELEY, the initiator of this further highly significant fact, might himself have participated deservingly in the award of the Nobel Prize, had he not, shortly after his discovery, met a hero's death on Gallipoli.)

A comprehensive survey of these scientific results was afforded by BARKLA'S book, "Status of Research in regard to Secondary X-Radiation", which appeared in 1908.

Other scientific problems with which BARKLA has successfully dealt are the ionisation of X-rays and its photographic effects, as also the phenomena of fluorescence.

Numerous scientific distinctions were conferred on BARKLA: the Solvay International Institute of Brussels awarded him a prize in 1912; in the following year he was invited by the „Deutsche Physikalische Gesellschaft" to lecture in Vienna at a meeting of German naturalists and physicians; in 1917 the Hughes Medal of the Royal

Society was conferred upon him, and in the same year the Nobel Prize for Physics, "for the discovery of the X-radiations peculiar to individual elements."

MAX VON PLANCK

Max von PLANCK, born at Kiel on April 23rd, 1858, was the son of Julius Wilhelm von PLANCK, an eminent teacher of law. He studied physics and mathematics at Munich and Berlin, where his choise of studies was determined mainly by CLAUSIUS'S treatises. In 1879 he took his doctor's degree in philosophy at Munich with a dissertation on the second main clause of the theory of heat, and in the following year became lecturer in physics at the same university.

Five years later he was appointed extraordinary professor at the university of his native town, whence, upon the demise of KIRCHHOFF in 1889, he was summoned to fill that scientist's chair at the newly-founded institute for theoretic physics of Berlin University. Here, having advanced to a full professorship in 1892, he remained until the year 1928.

Meanwhile, the Prussian Academy of Sciences had in 1894 enrolled him among its ordinary members, and in 1912 made him its permanent secretary.

PLANCK has greatly enriched modern physical science by his extraordinarily fertile genius, and in particular by his famous "doctrine of elemental quanta", established in the year 1900. This hypothesis, introducing to physics a new fundamental and universal constant, not only provided the general formula, long sought in vain, for the spectral distribution of heat radiation by way of the "law of radiation" that bears his name; it soon afterwards proved of great value in regard to the problem of the specific heat of solid bodies, in explaining the effect of light-electricity, and in many other phenomena of electric science. It throws light on the constructive law of the periodical system of elements, and lays the foundation for a future astronomy of atoms.

The new direction in physical research founded by PLANCK'S ideas led, in 1913, to BOHR'S "quantum theory of atoms", which bore out the essential theories initiated by PLANCK.

Physical science, meanwhile, also owes pioneer work of great significance to Max von PLANCK in the realm of thermo-dynamics. At an early stage in his investigations PLANCK had turned his special attention to the phenomena of diluted solutions, in which respect, as also subsequently in regard to the problems raised by NERNST'S doctrine of heat, he furnished many valuable explanations and, in many instances, also opened up new channels of research.

A wide distribution was accorded PLANCK'S excellent manuals on the various branches of theoretic physics, which, based on his lectures, went through numerous editions. Mention should also be made of his early work on "The Principle of Maintained Energy", which appeared in 1887, earned him a prize at Göttingen University, and was reprinted many times.

PLANCK was awarded the Nobel Prize for Physics in 1918, "in recognition of the merit he had attained for the development of physical science by his discovery of the elemental quantum."

In 1930 he was elected President of the „Berlin Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften“, a post he occupied until 1933.

JOHANNES STARK

Johannes STARK was born on April 15th, 1874, at Schickenhof in the Upper Palatinate, Bavaria, and studied chemistry, crystallography, and mathematics at Munich University, at the Physical Institute of which seat of learning he soon after became assistant. In 1900 he became lecturer in physics at the University of Göttingen, in 1906 professor extraordinary at the Polytechnic of Hanover, and in 1909 professor at the Polytechnic of Aix-la-Chapelle, where he continued to lecture until 1917. In that year he followed a call to the University of Göttingen, and in 1920 to that of Würzburg, finally retiring in 1922.

STARK is one of the most eminent experimental physicists of the present day. The two discoveries that have made his name famous are the establishment of the DOPPLER effect in canal rays and that of the splitting of spectral lines in the electric field, a discovery that constituted a victory over tremendous experimental difficulties.

The so-called STARK effect, as the electric splitting of spectral lines is now generally called, proved a brilliant confirmation of the modern quantum theory of atoms. The wonderfully precise accordances, devoid of all fractional results, that characterise the new theory of atoms, nowhere else appear in such beautiful completeness as in the case of STARK'S effect.

In the twenties STARK did eminently valuable speculative work in regard to the nature of chemical forces and to problems of atomic and molecular structure. In part, his ideas in this respect have been set forth in his three-volume book, „Prinzipien der Atomdynamik".

In the year 1904 he founded the „Jahrbuch der Radioaktivität und Elektronik", which he edited himself until 1919.

STARK at present holds the office of President of the „Deutsche Forschungsgemeinschaft" (formerly known as the „Notgemeinschaft der deutschen Wissenschaft").

He was awarded the Nobel Prize "for his discovery of the Doppler Effect in canal rays and of the division of spectral lines in the electric field."

CHARLES EDOUARD GUILLAUME

Charles Edouard GUILLAUME was born on February 15th, 1861, at Fleurier in the Swiss Jura, a village famed for its construction of clocks. His father, Edouard GUILLAUME, came of a line of gifted clockmakers, an art that had been handed down from father to son. Upon the completion of his studies at the Neufchâtel Polytechnic, where, besides physics, he had been mainly interested in mathematics, young Charles Edouard, in 1878, secured the post of assistant to Professor H. SCHNEEBELI, a fact which determined his choice of phycics as a career. At the age of twenty-one he succeeded, by a practical investigation into the problem of electrolytic condensers, in acquiring his doctor's degree. In the following year he entered the "Bureau International des Poids et Mesures at Sèvres" near Paris, where, as the result of comprehensive thermometric studies, he published a "Traité pratique de thermométrie de précision" in 1889.

GUILLAUME is the discoverer of an alloy known as "invar", which is characterised by an extremely small degree of expansion under the influence of heat; this and other nickel-iron alloys he first applied in 1897 to watchmaking, besides which he constructed of invar measuring-rods for geodetic purposes. It is this improvement of scientific measuring-instruments in particular that has made him famous.

In regard to his publications, special mention may be made of his "Unités et étalons" (1893), "Recherches sur le nickel et ses alliages" (1898), "Recherches sur les aciers au nickel" (1899), "Les applications des aciers au nickel" (1904), and, jointly with J. R. BENOTT, "La mesure-rapide des bases géodésiques", a book that has run through several editions.

The award of the Nobel Prize was "in recognition of his discovery of the anomalies of nickel-steel alloys and their importance in the physical science of precision."

Since 1915 GUILLAUME, who resides at Breteuil near Sèvres, has been at the head of the "Bureau International des Poids et Mesures."

NOBEL PRIZE for 1921

ALBERT EINSTEIN

Albert EINSTEIN was born on March 14th, 1879, at Ulm in Württemberg, but spent his childhood at Munich, and in 1894 removed with his parents to Switzerland. He studied physics and mathematics at Zurich, and was engaged as an expert at the Federal Patent Office at Berne, where he stayed till 1909. While thus employed, he concluded his university curriculum, graduating doctor of philosophy in 1905. Four years later, he was already lecturing as a professor at Zurich University, in the following year at Prague, and from 1912 till 1914 again at Zurich, this time at the Federal Polytechnic.

In the year 1914 EINSTEIN was appointed ordinary member of the Prussian Academy of Sciences in Berlin. He also soon after became head of the „Kaiser-Wilhelm-Institut für Physik".

EINSTEIN owes his world fame to the theory of relativity of which he is the founder. In his conception of this theory four stages of development may be distinguished. In 1905, what is known as the "special theory of relativity" came into being, embodying completely new conceptions of the nature of space and time and of the mechanical mass, culminating in the conclusion that mass and energy are identical, a principle that found much important application in physics, chemistry, and astronomy.

In 1915 an extension of the original theory led to the so-called "general theory of relativity", engendering at the same time a new conception of the nature of gravitation, and entailing sensational inferences in the field of astronomy, which, however, found astounding confirmation in subsequent observations, in particular on the occasion of total eclipses.

In 1917 EINSTEIN once more expanded his theory of relativity, which he clothed in a new form, arriving, *inter alia,* at the surprising conclusion that the universe must necessarily be finite both in volume and in mass. That, soon afterwards, the Dutch astronomer DE SITTER should actually succeed, on the basis of EINSTEIN'S ideas, in establishing definite numeric values for the size and mass of the universe, may be considered to represent a signal triumph of the EINSTEIN theory.

In 1929, finally, EINSTEIN remodelled his theory of relativity in such wise as to unite the theory of electricity and the theory of gravitation in a single, uniform "theory of physical fields".

Apart from the inception of the theory of relativity, EINSTEIN'S greatest achievement may be considered to lie in his knowledge of the existence of light quanta. On the basis of PLANCK'S hypothesis of the elemental quantum of effect, EINSTEIN, in 1905, formulated the theory that light is, in a certain sense, composed of light atoms, the energy of which is represented by the product of PLANCK'S universal constant and the frequency of light.

By this hypothesis EINSTEIN succeeded, at a single blow, in solving the riddle of the effect of light electricity, while the photo-chemical law of equivalents that now bears EINSTEIN'S name constitutes an especialy significant conclusion culled from the hypothesis of light quanta.

A further important application of the conception of quanta EINSTEIN discovered in the theory of specific heat. By means of this conception, he managed to explain the formerly enigmatic anomalies evinced by the thermal phenomena of solid bodies at low temperatures.

Almost simultaneously with his theories of relativity and light quanta, EINSTEIN set up an extraordinarily simple theory of molecular vacillations, which he applied most successfully to what is known as BROWN'S motion.

In 1915, in collaboration with the Dutch physicist DE HAAS, EINSTEIN succeeded, by means of a brilliant experiment, in furnishing the empiric proof of molecular currents.

When DE BROGLIE initiated the conception of material waves in the year 1924, EINSTEIN discovered an important possibility of applying the new ideas to the theory of gases. His work in this direction tended in particular to point the way for SCHRÖDINGER'S famous mechanism of waves, created soon afterwards by an exploitation of EINSTEIN'S ideas.

Among other achievements of EINSTEIN'S a new deduction of PLANCK'S radiation formula and a theory regarding what is known as gas deterioration deserve, at any rate, to be briefly mentioned here.

In connection with the award of the Nobel Prize, conferred on him "for his merits on behalf of theroretic physics, and in particular for his discovery of the law of the photo-electric effect," EINSTEIN delivered a lecture in 1923 at the meeting of Northern Naturalists at Göteborg, under the title of "Basic Ideas and Problems of the Theory of Relativity."

EINSTEIN, who was for several years at the head of the "German League for Human Rights", has long played an important rôle in efforts making for international reconciliation and world peace.

NIELS BOHR

Niels BOHR was born at Copenhagen on October 7th, 1885. Upon completing his university studies in his native town, where he graduated in 1911, he lectured in physics at his alma mater from 1913 to 1914. In the latter year he went in the same capacity to the Victoria University of Manchester, but returned two years later to Copenhagen, where he has since occupied the chair of theoretic physics. In addition he undertook, as from 1920, to conduct the Institute for Theoretic Physics attached to the university.

Already as an undergraduate BOHR aroused general attention in connection with a scientific prize-question set by the Danish Academy of Sciences; this question BOHR succeeded in solving by means of theoretic and experimental investigations in the laboratory of his father, Professor Christian BOHR, and the prize was awarded him in 1908. The disputation he delivered after graduating dealt with the explanation of the physical properties of metals with the aid of the electron theory, and his subsequent work was likewise devoted to problems of the theory of atoms. It was in 1913, at the early age of twenty-eight, that he established his fame by conceiving the theory of atomic quanta. Starting from the belief that, within the atoms, the electrons can only follow such courses as suffice for definite quanta-relations, he arrived at a correct explanation of the hydrogen spectrum. In further confirmation of his theory, he established that certain spectral lines, which until then had wrongly been attributed to hydrogen, were peculiar to helium, as, in fact, experiments show that these lines can be produced in helium tubes wholly devoid of any admixture of hydrogen. Indeed, BOHR'S theory of atoms even demonstrated the possibility of ascertaining the most important constants of the science of electricity by mere spectroscopic observation.

In 1920 BOHR set up a theory for the periodical system of elements, the practical outcome of which was the discovery of the formerly unknown element, "hafnium", (so called after the town of Copenhagen). In the later twenties, BOHR attained special merit in casting light on the theoretic and natural-philosophic significance of the new science of wave mechanism.

The award of the Nobel Prize was "for his work in the study of the structure of atoms and of the radiations emanating therefrom."

BOHR lives at Copenhagen.

NOBEL PRIZE for 1923

ROBERT ANDREWS MILLIKAN

Robert Andrews MILLIKAN was born at Morrison, Illinois, on March 22nd, 1868. He was educated at Maquoketa, Iowa, and at Oberlin, Ohio, and in 1893 started teaching physics at Oberlin College, where he had graduated B. A. in 1891. In 1895 he acquired the Ph. D. degree at Columbia University, New York City, and went to Europe to supplement his studies at Göttingen and Berlin. On his return he was appointed instructor, and in 1902 professor of physics, at Chicago University. Since 1921 he has been director of the Norman Bridge Laboratory of Physics in the Californian Technological Institute at Pasadena, over the excutive council of which seat of learning he likewise presides.

While his early studies had by no means centred on physics, Greek and mathematics primarily engaging his attention, he was induced after graduation to turn his mind to physical science, practically all realms of which he has since enriched and promoted.

MILLIKAN'S fame was in the first place established by his experimental measurements of the electric quantum of elements, which, despite its infinitessimally small size, he succeeded in determining, within one-thousandth degree of exactitude, at $4.9016.10^{-10}$ electro-static units.

Other valuable investigations of his dealt with the photo-electric effect and enabled him to arrive at a very precise determination of the elemental quantum of effect. Mention must likewise be made of his spectroscopic measurements in distant ultra-violet rays, whereby he was able to bridge the gap dividing this field from that of X-rays. This line of research also led to his discovery of the theoretically highly important spectra of the so-called "stripped atoms", i. e. atoms that have forfeited all but one of their valence-electrons.

Great interest was aroused in 1928 by MILLIKAN'S discovery that, at high-mountain altitudes, rays from the sky will penetrate water to a depth of 80 metres, at the same time showing a wavelength far smaller than that of X-rays or γ-rays. On the strength of their measurements, MILLIKAN and his collaborators ventured to assume that these rays furnish evidence of the incessant formation in the cosmos of the most frequent elements, such as oxygen, magnesium, and iron.

MILLIKAN is a member of numerous scientific societies and academies and honorary doctor of several prominent universities; he has been awarded the Comstock Prize of the National Academy of Sciences, the Edison Medal of the American Institute of Electric Engineers, and the Hughes Medal of the Royal Society, London. He was, moreover, the first exchange-professor to Belgium in 1922.

MILLIKAN received the Nobel Prize "for his works on the uniform electric charge and the photo-electric effect."

NOBEL PRIZE for 1924

MANNE SIEGBAHN

Karl Manne Georg SIEGBAHN is one of the most eminent of living Swedish physicists. (For the essential points of the following expatiations, we are indebted to Dr. Axel E. LINDH, Lecturer at Lund University, who has kindly placed a biographical sketch at our disposal.)

SIEGBAHN was born at Örebro, Sweden, on December 3rd, 1886. After attending secondary schools at Hudiksvall and Norrmalm, he repaired to Lund University to study mathematics, astronomy, and physics. Having proceeded to Göttingen in 1908 and to Munich in 1909 for the continuation of his studies, he returned to Lund, where he graduated Ph. D. in 1911 with a dissertation on "Magnetic-Field Measurements", and was immediately appointed instructor in physics.

Already in 1907 SIEGBAHN had been engaged as assistant to Professor J. RYDBERG, then at the head of the Lund Physical Institute, and this post he resumed upon his return from Germany and retained until 1915, when he became deputy-professor in physics. In 1920 SIEGBAHN succeeded RYDBERG in his professorship; three years later he was appointed to succeed Professor GRANQUIST at the university of Uppsala, where he is still lecturing.

In 1911 his research took him to Paris and Berlin, and in 1914 again to Berlin and to Heidelberg; in 1920 he again visited French and German universities and also similar institutions in Switzerland and Holland, whereas later journeys took him to England, Belgium, Czechoslovakia, and America in response to invitations to lecture at various seats of learning.

Between 1908 and 1914 SIEGBAHN'S scientific investigations dealt mainly with the problems of electricity and magnetism; since 1914 it has been principally the physical study of X-rays and their spectroscopy that has engaged his attention. This line of research opened in 1914 with a first tentative investigation of K-rays. During the next few years, partly alone and partly in collaboration with others, he engaged in a thorough and systematic investigation of the X-ray spectra of the different elements, a study which led to the discovery of a great number of new spectral lines. In 1916 he succeeded in discovering a new spectral series, the long-wave M-lines, which he proceeded to examine. The great difficulties connected with all further search for longer waves in the various spectral series were brilliantly overcome with the aid of SIEGBAHN'S light-resisting vacuum and high-vacuum spectrographs, added to which his thoroughly tested and reliable metal X-ray tubes provided X-ray spectroscopists with an instrument by which the times of exposure, formerly inordinately long, could be substantially diminished. Alongside these successful endeavours, SIEGBAHN managed, thanks to his precise and successively improved spectrographs for individual wave fields, and to the methods of adjustment and measurement which he was constantly engaged in ameliorating, to raise the degree of accuracy in wave-length measurements in regard to X-rays to an altogether unforeseen level. Thanks to his efforts, it became possible to establish relative wave-lengths in the field of X-rays to within $^1/_{100\,000}$th of absolute accuracy.

This precision in measurement enabled scientists to approach problems the solution of which had formerly appeared quite hopeless. Suffice it to refer here to the deviation from BRAGG'S law of reflexion and to the wonderfully precise investigations regarding this fundamental law of X-ray spectroscopy that have been carried out in SIEGBAHN'S laboratory. Thanks to this great accuracy of measurement, moreover, we have now at our disposal exact indications as to the conditions of energy in the atoms of the various elements. It may furthermore be pointed out that in 1924 SIEGBAHN and his collaborators succeeded in furnishing proof of the diffraction of X-rays in prisms.

Of late years the research carried on in SIEGBAHN'S institution has been more and more directed towards the intermediate field between X-rays and ultra-violet rays. For these investigations, too, SIEGBAHN has constructed reliable high-vacuum spectrographs; moreover, the optical grids employed in this line of research are constructed in SIEGBAHN'S own institution with the aid of a grid-machine conceived by himself. The results so far published in this new field of work guarantee that further achievements of great value to the physical science of atoms may confidently be expected to issue from the SIEGBAHN laboratory.

SIEGBAHN'S comprehensive and successful investigations and discoveries in the area of X-ray spectra earned him the Nobel Prize for Physics in 1924.

After he had for many years published his numerous treatises mainly in scientific periodicals, SIEGBAHN presented them in a collected form in 1925 as, "The Spectroscopy of X-Rays".

NOBEL PRIZE for 1925

JAMES FRANCK

James FRANCK, born at Hamburg on August 26th, 1882, first studied chemistry at Heidelberg, and then principally physics in Berlin, where he was a pupil of WARBURG'S and DRUDE'S. In 1906 he took his doctor's degree in philosophy at Berlin University, and, after acting for a short while as assistant-instructor in physics at Frankfort on Main, returned to assist Professor RUBENS in Berlin, where he became lecturer in physics in 1911. In the year 1918 he became a member and departmental chief of the „Kaiser-Wilhelm-Institut für physikalische Chemie" at Berlin-Dahlem, but two years later he followed a call to Göttingen, where he was installed as professor of experimental physics and director of the Second Physical Institute in the university.

FRANCK'S work is experimental and owes its inception, in the main, to his appreciation of the modern theory of atoms. It deals above all with the incitement of the atoms by electron-shocks, the fundamental assumptions of the present-day theory of atoms finding supreme confirmation in the fact that, in collaboration with Gustav HERTZ, FRANCK was able, even by purely electrical investigations, to corroborate BOHR'S optical theory of spectra, according to which atoms are incapable of absorbing any quantities of energy that lie below a certain level.

In the year 1926 FRANCK conceived a brilliant method of determining the dissociation temperatures of chemical combinations, heretofore known only on the basis of chemical measurements, in an optical way, i. e. by examination of the molecular spectra.

The wonderful coincidence of values attained in two such fundamentally different ways likewise constitutes the best confirmation of the basic assumptions of the modern theory of atoms.

Importance also attaches to FRANCK'S investigations in the realm of photo-chemistry, and in regard to the metastable conditions of atoms, i. e. conditions from which incited atoms cannot return to their original condition in a normal way and which therefore possess a finite period of existence, a period FRANCK succeeded in measuring.

The award of the Nobel Prize was made jointly to FRANCK and HERTZ.

In connection with this conferment, FRANCK delivered a Nobel Lecture at Stockholm in 1926 in the form of a short survey elucidating the problems of electron-shocks as treated by himself and Professor HERTZ.

Professor FRANCK resides at Göttingen.

NOBEL PRIZE for 1925

GUSTAV HERTZ

Gustav HERTZ, the son of a lawyer, was born at Hamburg on July 22nd, 1887, studied at the universities of Göttingen, Munich, and Berlin, and attained his doctor's degree in philosophy in Berlin in 1911 with a dissertation on "The Ultra-Violet Absorption Spectrum of Carbolic Acid in its Dependence on Pressure and Partial Pressure".

In 1913 he became assistant-instructor at the Physical Institute of Berlin University, where, four years later, he was appointed lecturer in physics. From 1920 till 1925 he worked in the physical laboratory of the PHILIPS incandescent-lamp factories at Eindhoven, Holland; in the latter year he was summoned to Halle as professor-in-ordinary of physics and head of the Physical Institute in Halle University. Since 1928 he has been lecturing in a like capacity at the Berlin Polytechnic.

Professor HERTZ'S scientific work refers mainly to the problem of electron-shocks. Both by himself and in collaboration with James FRANCK, he has attained valuable results in regard to the measurement of the ionisation-tension in various gases, to the exchange of energy in collisions between slow electrons and gas molecules, to the incitement and ionisation tensions of neon and argon in connection with the spectra of these gases, to the incitement of spectral lines by electron-shocks, and to other matters, publishing his results for the main part in scientific periodicals.

The award of the Nobel Prize for the year 1925 in equal parts to him and Professor FRANCK was "for their discovery of the laws governing the collision between an electron and an atom".

In the Nobel Lecture which HERTZ delivered at Stockholm in 1926 he dealt with "The Results of Electron Experiments in the Light of BOHR'S Theory of Atoms".

Professor HERTZ lives in Berlin.

JEAN PERRIN

Jean PERRIN was born at Lille on September 30th, 1870, where he was educated at the "école normale supérieure", attaining the degree of "docteur ès-sciences" in 1897. In the same year he was entrusted with a readership in physical chemistry at Paris University, where in 1910 he was accorded the title of professor. In 1923 he became member of the "Académie des sciences" and thereby also of the "Institut de France".

PERRIN'S main writings refer to what are known as molecular phenomena of oscillation. The discovery that did most to establish his fame was that of the occurrence, in colloidal solutions or in suspensions and emulsions, i. e. in liquids containing larger or smaller solid floating particles, of such a degree of equilibrium, under the twofold influence of weight and of molecular motion, as would permit the actual size of the atoms to be calculated with great accuracy from the distributional level of density.

PERRIN has likewise dealt with BROWN'S Motion and with problems of the electric potential of contact. His chief book was "Les Atomes", published in 1913.

PERRIN has been awarded numerous honours and distinctions: in 1896 he received the Joule Prize of the Royal Society, in 1912 the Vallauri Prize of Bologna, and in 1914 the La Caze Prize of the Paris Academy; he is honorary doctor of the universities of Berlin, New York, Manchester, Oxford, and Ghent, as also member of several academies. In 1926 he was made Commander of the French Legion of Honour.

In the same year PERRIN was awarded the Nobel Prize for Physics, "for his works on discontinuity in the structure of matter, and in particular for his discovery of the equilibrium of sedimentation".

ARTHUR HOLLY COMPTON

Arthur Holly COMPTON was born at Wooster, Ohio, on September 10th, 1892, and studied at his native town and at Princeton University, where he took his Ph. D. degree in 1916. After teaching physics for a year as private lecturer at the University of Minnesota, he worked for two years as research engineer for the Westinghouse Light Company, Pittsburgh. Having thereupon put in several months' work at Cambridge University in England, he was, in 1920, appointed professor of physics and head of the Physical Institute at the Washington University of St. Louis. Since 1923 he has been lecturing in the same capacity at the University of Chicago.

COMPTON started his scientific work with investigations regarding X-rays; his graduation thesis developed a theory according to which the intensity of ray reflexion in crystals is akin to the distribution of electrons in the atoms. Ever since 1918 he has been engaged on the theoretic and experimental investigation of the dispersion of X-rays, which study led him, in 1923, to the great discovery now known as the COMPTON Effect.

This lies in the fact that in their dispersion X-rays suffer a diminution of frequency, i. e. of hardness, which alternation must provedly be attributed solely to the angle of dispersion, whereas it is otherwise entirely dependent on universal constants. COMPTON succeeded quite correctly in explaining this phenomenon as being occasioned by a collission between light quanta and electrons with the presumption that the light quanta must be assumed to possess not only energy but also extent of motion in the mechanical sense. In this way the COMPTON Effect acquires the value of an immediate experimental confirmation of the bold assumption that light is composed of separate particles, corresponding in their essential properties to the particles of matter.

The results of COMPTON'S research have been published in numerous scientific periodicals and also, in a comprehensive form, in his book, "X-Rays and Electrons" (1926).

In 1929 COMPTON set forth an ingenious method of measuring the wave-length of X-rays, formerly only determinable indirectly by means of crystals, in an absolute way by the aid of the motion-grids employed in optics. This new method, conceived by COMPTON and further developed by several other American physicists, is of particular significance, by reason of the fact that the comparison between directly and indirectly measured wave-lengths of X-rays furnishes an extremely accurate new method for establishing the universal constants (electric elemental quantum and LOSCHMIDT'S number).

The Nobel Prize was awarded to COMPTON and to Charles T. R. WILSON simultaneously, in the case of the former, "for his discovery of the effect that bears his name."

COMPTON resides in Chicago.

CHARLES WILSON

Charles Thomas Rees WILSON, a Scottish farmer's son, was born on February 14th, 1869, at Glencoe, in the county of Midlothian. After the father's death the family removed to Manchester, where the boy was educated. At Owen's College, Manchester, he studied zoology, botany, and geology, but in 1888 he went to complete his studies at Cambridge, and there turned his attention mainly to physics and chemistry, finally taking his degree in 1896. The commencement of the present century saw him instructor and demonstrator in physics at Cambridge University; in 1913 he was appointed observer in meteorological physics at the Observatory for Solar Research, in 1918 lecturer on atmospheric electricity, and in 1925 Jackson Professor of Physics at Cambridge.

WILSON'S research has ever since 1895 dealt with atmospheric electricity with special reference to the radio-activity of rain and snow, as also with the goldleaf-electrometer and its application in measuring the electricity of the atmosphere. His experimental masterpiece was undoubtedly the method he conceived of rendering the courses of the original particles of matter so far visible as even to permit of their being photographed. To this end he caused the particles emitted by radio-active substances to pass through a space filled with supersaturated steam, in which the course described was visible in the form of a fine, cloudy streak.

In 1900 WILSON was elected a member of the Royal Society, which awarded him the Hughes Medal in 1911 and the Royal Medal in 1922. Besides these distinctions, the Hopkins Prize of the Cambridge Philosophical Society was conferred on him in 1920, the Gunning Prize of the Royal Society of Edinburgh in 1921, and the Howard Potts Medal of the Franklin Institute in 1925.

The Nobel Prize for Physics war awarded him (at the same time as to COMPTON) "for the dicovery of his method of rendering discernible the courses of electrically charged particles by steam condensation."

NOBEL PRIZE for 1928

OWEN WILLIAM RICHARDSON

Owen William RICHARDSON was born on April 26th, 1879, at Dewsbury, in the county of Yorkshire. He studied at Cambridge, where he graduated in 1900, thereupon continuing until 1906 to engage in physical research at the Cavendish Laboratory. For the following seven years he was professor of physics at the university of Princeton, but in 1913 he returned to England, being appointed Wheatstone Professor of Physics at King's College, London University. This chair he occupied until 1924, when he became Yarrow Research Professor of the Royal Society. Since 1924 he has likewise been director of the Physical Laboratory at King's College.

RICHARDSON'S scientific work started in 1900 from the so-called "incandescent electric effect", i. e. the fact that incandescent bodies are surrounded by air conductive of electricity. This fact had already been known for about 150 years, but at the commencement of the present century its true nature was still a riddle. In the pursuit of this phenomenon, RICHARDSON gave evidence of extraordinary ability both as an experimental and as a theoretic physicist. In the course of a few years he succeeded in establishing the growth of the kinetic energy of electrons within a body in keeping with the increase of temperature, as also the directives governing the electrons emitted by hot bodies and known as thermo-ions. What has since then been known as RICHARDSON'S Law establishes the dependency of the emission of electrons on temperature, lending mathematical expression to the relation in question. RICHARDSON developed a theory of phenomena, according to which the emission of electrons on the part of a hot body, such as, e. g. an electric-lamp wire, is described in a way similar to the evaporation of molecules from a solid or liquid surface. The essential idea thereby introduced to physical science is that of a workfunction measuring the amount of work requisite for the release of an electron from the body.

This theory RICHARDSON had already worked out at Cambridge between 1901 and 1906; the development of these "thermo-ionics", as he first called the new line of thought in 1909, was continued by him in America, where, either alone or together with certain collaborators, he made the first reliable observations regarding the cooling effect of electrons, forming an analogy in thermo-ionics to the cooling of liquids by evaporisation.

Jointly with H. L. COOKE, RICHARDSON then made the first observations of the opposite effect, the heating of metallic wires by the absorption of electrons. He also demonstrated that the electrons emitted by a hot body are distributed in keeping with MAXWELL'S law of velocity-distribution, and that their medium kinetic energy coincides with that of a gas molecule at the same temperature.

In a theoretic respect, RICHARDSON sought to generalise the theory of thermo-ionic emission to the utmost possible extent on the basis of thermo-dynamic principles. By these and other experiments and treatises he raised thermo-ionics to the rank of an exact science.

RICHARDSON'S attempts also acquired practical significance for the development of incandescent cathode-tubes, and thereby for broadcasting, albeit Professor RICHARDSON himself has never participated in the practical exploitation of his valuable achievements.

RICHARDSON'S scientific investigations far exceed the limits of thermo-ionics. He predicted the gyro-magnetic effect long before it was actually observed in experiments. His investigations in the photo-electric field have acquired fundamental importance. He has furnished valuable contributions to spectroscopy, especially as regards alignment of the tremendously complicated, but no less important, molecular spectrum of hydrogen. Other realms of science substantially enriched by his research work are those of X-rays, and the emission of electrons accompanying certain chemical reactions.

As regards his publications, special mention must be made of his "Electron Theory of Matter" (written in 1912, but only published two years later) and his "Emission of Electricity from Hot Bodies" (1916), both of which books have already been reprinted. Numerous smaller treatises have appeared in physical publications.

RICHARDSON has also been most successful in training eminent disciples, among them A. H. COMPTON, likewise distinguished by the Nobel Prize.

RICHARDSON is member of numerous scientific societies and honorary member of the American Philosophical Society. In 1920 he was awarded the Hughes Medal, and ten years later the Royal Medal, of the Royal Society. In 1922 he presided over Section A of the British Association; from 1926 to 1928 he was President of the London Physical Society.

The Nobel Prize was awarded him "for his work in regard to the thermo-ionic phenomenon, and in particular for the discovery of the law known by his name".

NOBEL PRIZE for 1929

DUKE LOUIS VICTOR DE BROGLIE

Louis Victor, 7th DUC DE BROGLIE, was born at Dieppe on August 19th, 1892. He is the younger brother of the late Maurice, 6th DUC DE BROGLIE, Secretary of the "Société française de physique" and well known for his investigations in regard to X-rays and BROWN'S motion.

Louis Victor DE BROGLIE studied at the Sorbonne, attaining the respective degrees of "licencié ès-letters" in 1910, "licencie ès-sciences" in 1913, "and docteur ès-sciences" in 1924, his dissertation on the last occasion dealing with the "Recherches sur la théorie des quanta", which became the starting-point of the development of wave-mechanics. In the year 1928 DE BROGLIE was appointed professor of theoretic physics at the Poincaré Institute in the Sorbonne.

The great discovery which made him famous in science was of a purely theoretic nature; it was based on the fact that, by reason of the latest experimental discoveries, physicists had accepted a sort of dualism in regard to the nature of light, connecting, as they did, the conception of light-waves with a corpuscular image of light, and thus attributing to light essential properties of matter.

DE BROGLIE'S brilliant achievement lay in his arrival at the conclusion, by a reversion of this line of thought, that matter itself must likewise be credited with possessing the nature of waves, or, in other words, that the movement of material particles must be accompanied by what might be called material waves. Bold as such an idea appeared at the outset, it was not long in finding complete confirmation through the beautiful experiments made by DAVISSON and GERMER in the laboratory of the Bell Telephone Company in New York, where proof could be furnished that in fact electron-rays, i. e. swarms of diminutive material particles, are reflected through crystals in exactly the same way as had long been known in regard to X-rays and therefore to light.

DE BROGLIE'S theory was subsequently also corroborated by further successful attempts, especially at the hands of RUPP of Germany, and KIKUCHI of Japan.

For the latest theoretic physics, the ideas of De BROGLIE proved of the very greatest importance, for a further development of his theory can be detected in the brilliant investigations of SCHRÖDINGER, which have put modern wave-mechanics into a mathematically usable form, thereby imparting to them a refinement which permits of their application to the physics of atoms, and is analogous to that experienced centuries ago, when the optics of rays developed into the optics of waves.

It may therefore perhaps be said without exaggeration that DE BROGLIE'S ingenious speculation has initiated a new era in the history of theoretic physics.

De BROGLIE subsequently published the new ideas set forth in his doctor's dissertation on broader lines under the title of "Ondes et mouvements". A more recent work from his pen was his "Introduction à l'étude de la mécanique ondulatoire".

The Nobel Prize was conferred on him, "for his discovery of the wave-nature of electrons". In the same year he was likewise awarded the Poincaré Medal of the Paris "Académie des sciences".

DE BROGLIE lives in Paris.

NOBEL PRIZE for 1930

SIR CHANDRASEKHARA RAMAN

Chandrasekhara Venkata RAMAN was born on November 7th, 1888, at Trichinopoli, Madras Presidency, where his father was a teacher at the S. P. G. College. When the boy was four years old, the family removed to Vizagapatam, also in southern India, where he received his early education. In 1902 he repaired to the Presidency College, Madras, to study for his university degree. Here he took his B. A. in 1904, winning first prize and a gold medal in physics, and graduating M. A. three years later, also with the highest distinctions. His eartiest researches in optics and acoustics were carried out while he was still a student, his first paper to be published (in the London "Philosophical Magazine") being on the diffraction-bands observed when light is reflected very obliquely at the face of a prism.

At that time the only superior employment open to Indians and not requiring a stay in Europe was the Indian Finance Department. Not seeing any possibility of a scientific career, RAMAN secured first place in the competitive examination, and joined the service as assistant accountant-general at Calcutta in June 1907.

Though the duties of his office took up most of his time, RAMAN found opportunities for carrying on experimental research in the laboratory of the Indian Association for the Cultivation of Science. Later, when transferred, first to Rangoon and then to Nagpur, he continued his investigations in an improvised laboratory. Fortunately, he was recalled to Calcutta in 1911, and again made use of the Association's premises.

RAMAN'S success in research attracted the attention of the late Sir Asutosh MOOKERJEE, then vice-chanceller of Calcutta University, who offered him the newly-endowed Palit Chair of physics. Though this represented a great loss in a pecuniary sense, RAMAN agreed with alacrity. He thus quitted government service in 1917 in favour of a professorship which he has held ever since. As from 1919, he has also been honorary secretary of the Indian Association for the Cultivation of Science. He is likewise editor of the Indian Journal of

Physics, which he founded in 1926.

Some of his early writings appeared as "bulletins" of the Indian Association, bulletins 6 and 11 dealing with the maintenance of vibrations, and bulletin 15 (a volume of 158 pages) with the theory of the musical instruments of the violin family. On the latter subject he contributed an article to the „Handbuch der Physik," published by Julius SPRINGER in 1928. An essay on the "Molecular Diffraction of Light" was published by Calcutta University in 1922, while his lecture describing the new radiation effect he had discovered appeared in the "Indian Journal of Physics" in 1928.

RAMAN received the D. Sc. degree of Calcutta University (honoris causa) in 1922, and the honorary Ph. D. degree of Freiburg University in 1929. He was elected a Fellow of the Royal Society of London in 1924. In 1928 he was awarded the Matteucci Medal of the "Società Italiana delle Scienze" for his discovery of the radiation effect. He was knighted in 1929.

The Nobel Prize was conferred on him "for his works on the diffusion of light and for the discovery of the effect known by his name."

NOBEL PRIZE for 1932

WERNER HEISENBERG

Werner HEISENBERG was born at Duisburg, Rhenish Prussia, on December 5th, 1901; he was the son of Dr. August HEISENBERG, later a university professor. Having studied theoretic physics in Munich, mainly under Professor SOMMERFELD, he graduated there in 1923. He then became assistant to Professor BORN at Göttingen, where he himself started lecturing in 1924. Two years later he became lecturer at Copenhagen University, where he had studied for a term (1924/25), as stipendiary of the ROCKEFELLER Foundation, under Niels BOHR. But the next year, 1927, saw him back again in Germany, installed at Leipsic University as professor of theoretic physics at the early age of 26. This chair he has since continued to occupy.

His most important publications to date are „Über quantentheoretische Umdeutung kinematischer und mechanischer Beziehungen" (1925), „Mehrkörperproblem und Resonanz in der Quantenmechanik" (1926), „Über den anschaulichen Inhalt der quantentheoretischen Kinematik und Mechanik" (1927), and „Zur Theorie des Ferromagnetismus" (1933).

The Nobel Prize for Physics was awarded him "for the creation of quantum-mechanics, the application of which has, among other things, led to the discovery of the allotropic forms of hydrogen."

PAUL ADRIEN DIRAC

Paul Adrien Maurice DIRAC, son of a Swiss father and an English mother, was born at Bristol on August 8th, 1902. He was educated at the Merchant Venturers' School and studied electrical engineering at Bristol University, obtaining the B. Sc. degree in 1921, after which he went in for mathematics, first at Bristol and then at St. John's College, Cambridge. He began work on the new quantum mechanics immediately upon its introduction by HEISENBERG in 1925, and wrote a series of papers on the subject; they were published mainly in the "proceedings" of the Royal Society, and led up to his relativistic theory of the electron (1928), and to his theory of holes (1930), afterwards identified with positrons. He took his Ph. D. degree at Cambridge in 1926, became a Fellow of St. John's College in the following year, and a Fellow of the Royal Society in 1930. Two years later, he was appointed Lucasian Professor of Mathematics at Cambridge.

Since 1926, DIRAC has travelled considerably and studied at various foreign universities, including Copenhagen, Göttingen, Leyden, Wisconsin, Michigan, and Princeton. In 1929, after having spent five months in America, he went round the world, visiting Japan together with HEISENBERG and returning across Siberia.

The Nobel Prize was awarded him conjointly with SCHRÖDINGER "for the discovery of new fertile forms of the atomic theory."

ERWIN SCHRÖDINGER

Erwin SCHRÖDINGER, of a family long established in Austria but originating from the Upper Palatinate, was born in Vienna on August 12th, 1887. His mother was the daughter of Alexander BAUER, a meritorious professor of chemistry at the Vienna Polytechnic. Having studied physics in his native city, mainly under Fritz HASENÖHRL, he was promoted Ph. D. in 1910, and the following year became assistant to Franz EXNER. In 1914 he started lecturing on theoretic physics, but in 1920 repaired to Jena, where he was first of all assistant to Max WIEN, and later himself lectured on theoretic physics, with special reference to the more recent fields. In the same year, however, he was appointed professor-extraordinary at the Stuttgart Polytechnic, but quitted it in the following spring to accept a professorship at Breslau University. This post he again quitted in the autumn of the same year in favour of a professorship at Zurich, where he continued to lecture for six years. After a three-months lecturing-tour in the United States, he became successor, in 1927, of Max PLANCK in the latter's chair at Berlin University. From 1933 to 1936, he lectured as a guest, at Magdalen College, Oxford, and has, since the autumn of 1937, been Professor of Theoretic Physics at the University of Graz.

Apart from some smaller experimental investigations, SCHRÖDINGER has devoted himself entirely to problems of theoretic physics, his main field of interest being physical statistics, and his greatest achievement, which has earned him international renown, the establishment of wave-mechanics and the discovery of their relations to the mechanics of quanta. By the development of what is known as the SCHRÖDINGER equation of vibrations, the anomaly between the classic doctrine of waves and the theory of quanta has been successfully bridged.

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The Nobel Prize for Physics, which he shared with DIRAC, was conferred "for the discovery of new fertile forms of the atomic theory."

NOBEL PRIZE for 1935

JAMES CHADWICK

James CHADWICK was born on October 20th, 1891, and educated at Manchester High School. He entered Manchester University in 1908 and graduated three years later in the "Honour School" of Physics; for the next two years, he did research work in the physical laboratory of his alma mater under Professor (subsequently Sir Ernest) RUTHERFORD on various problems of radioactivity.

In 1913 he was awarded the 1851 Exhibition Scholarship, and proceeded to the „Physikalisch-technische Reichsanstalt" at Charlottenburg, to work under Professor H. GEIGER.

Throughout the war he was confined in the camp for civilian prisoners-of-war at Ruhleben, Germany.

In 1919 he was awarded the Wollaston Studentship at Gonville and Caius College, Cambridge; he did research work in Cambridge until 1935, dealing with various problems of nuclear physics, with special reference to the artificial disintegration of elements by a-particles. He was elected a Fellow of Gonville and Caius College in 1921, and appointed assistant-director of research in the Cavendish laboratory in 1923.

In 1927 CHADWICK was elected to the Fellowship of the Royal Society, which awarded him the Hughes Medal one year later.

In 1935 he was elected to the Lyons Tones Chair of Physics in the University of Liverpool.

The Nobel Prize was conferred on him "for his discovery of the neutron."

VIKTOR HESS

Viktor F. HESS was born on June 24th, 1883, at Waldstein Castle near Deutsch-Feistritz, Styria, where his father was chief forester on Prince Oettingen-Wallerstein's estates. He studied at Graz, where he was particularly influenced by Leopold von PFAUNDLER and Viktor DANTSCHER. Promoted doctor of philosophy in 1906, he worked for the next four years under Franz EXNER at the Vienna Physical Institute. Here Egon von SCHWEIDLER introduced him to the new field of radio-activity and atmospheric electricity. Meanwhile he was for one year demonstrator at the mineralogical institute of Vienna University under Cornelio DÖLTER. From 1908 to 1920 he was a lecturer in physics at the Vienna veterinary college. At the same time he continued his scientific research work with great zeal and in 1910 started lecturing, in a private capacity, at Vienna University; in the same year he became assistant to Stefan MEYER at the newly-founded institute for radium research, at which he continued to work for ten years. In 1919 he was accorded the title of professor-extraordinary at the university.

In 1920 HESS was suggested, along with SCHRÖDINGER and KOHLRAUSCH, for a newly-founded extraordinary professorship at Graz University, to which he was appointed the same autumn. Almost simultaneously, he received a call, as physicist-in-chief, from the United States Radium Corporation at Orange, New Jersey; this nomination he obtained leave to accept in the following February. At Orange, HESS erected a research laboratory for the Radium Corporation, and was soon after entrusted with its control. He was also invited to lecture at various American universities. In 1931 he was appointed to a professorship at Innsbruck University (Austria) where he was likewise placed at the head of the institute for radium research.

Thanks to support on the part of the Vienna Academy of Sciences, the Prussian Academy of Sciences, the „Notgemeinschaft der deutschen Wissenschaft“ in Berlin, and in particular the Rockefeller Institution of New York, he managed, in the autumn of 1931, to erect a research-station for the constant observation of cosmic ultra-radiation on the Hafelekar mountain near Innsbruck, at a height of almost 7000 feet above sea-level.

HESS'S scientific work extends mainly to the area of radio-activity and atmospheric electricity. He has published some 70 scientific papers and a book on „Die elektrische Leitfähigkeit der Atmosphäre und ihre Ursachen“ (1926, translated into English in 1928), as also, jointly with H. BENNDORF, the chapter on "atmospheric electricity" in MÜLLER-POUILLET'S manual of physics.

Of his writings on radio-activity, we may specially mention those regarding heat-development by radium, the absorption of γ-rays in the atmosphere, the counting of the rays emitted by radium (in collaboration with R. W. LAWSON), and the "ionic wind."

Great importance attaches to the observations he has made from a liberated balloon in regard to penetrating radiation. On the strength of the results obtained in this connection, he was the first to establish the existence of a highly penetrative radiation of cosmic origin, since then known as "ultra-radiation" or "HESS'S radiation" (1912). The significance of this newly-discovered species of rays, both for geophysical and astro-physical problems, and for the general theory of radiation processes, has entailed a very intensive treatment of this field. Similarly, his work on the ion-content of the atmosphere and on the balance between ion-productive and ion-destructive processes represents a valuable contribution to our knowledge of the processes of atmospheric electricity.

Since 1936 Professor HESS has been lecturing at Graz.

The Nobel Prize was awarded him "for his discovery of cosmic radiation."

CARL DAVID ANDERSON

Carl David ANDERSON was born of Swedish parents in New York City on September 3rd, 1905. At the California Institute of Technology, he graduated Sc. B. in physics and engineering in 1927, and Ph. D. three years later, thereupon becoming a member of the physics staff in the character of "research fellow" (until 1933) and being subsequently appointed assistant professor of physics.

His early researches were in the field of X-rays. For his thesis for the doctor's degree he studied the space distribution of photoelectrons ejected by X-rays from various gases. In 1930, with Professor MILLIKAN, he began his cosmic-ray studies, which led, in 1932, to the discovery of the positron. He has studied the energy-distribution of cosmic-ray particles and the energy-loss of very high-speed electrons in traversing matter. In 1933 he and Dr. NEDDERMEYER obtained the first direct proof that γ-rays from "Th C" generate positrons in their passage through material substances.

The original publications of these investigations appeared in "Science" and in the "Physical Review."

NOBEL PRIZE for 1937

CLINTON JOSEPH DAVISSON

Clinton Joseph DAVISSON was born at Bloomington, Ohio, on October 22nd, 1881, and studied from 1902 to 1911 at the universities of Chicago and Princeton. He subsequently worked in the Carnegie Institute of Technology at Pittsburgh, Pennsylvania, and, as from 1917, in the service of the Western Electric Company in New York. Since 1925 DAVISSON has been working as an electro-physicist in the Bell Telephone laboratories in New York.

Jointly with Professor George THOMSON, and on the basis of the law of vibrations established in 1924 by the French physicist DE BROGLIE, C. J. DAVISSON has made experiments which prove that the cathodic rays hitherto interpreted as electrons, i. e. as electric particles set in very rapid motion, show phenomena of diffraction similar to those of light waves, that is to say, that they are diverted from their original direction by matter. These results of DAVISSON'S experiments were substantiated and confirmed by Professor THOMSON, son of the Joseph J. THOMSON who discovered the electron.

The scattering of an electron was first studied as far back as 1899 by Campbell SWINTON, who might well have discovered the wave-like interaction of electrons with matter. The results of the many further observations on the scattering of electrons were all found to be in accordance with classical or quantum mechanics until, in 1921, DAVISSON and KUNSMAN recorded directions of preferential scattering of an electron beam from a polycrystalline surface, which, however, they explained in terms of pure particle mechanics. Although Louis DE BROGLIE had formulated his theory associating wave systems with moving particles in 1924, it appears to have been rather the stimulus of an accidental observation which led C. J. DAVISSON and L. H. GREMER to study the scattering of slow electrons from the surface of a single nickel crystal, and in March 1927 they gave a preliminary summary of their results. This was followed in December of the same year by a more complete account, which established for the first time the wave properties of moving electrons, in agreement with DE BROGLIE'S theory.

Since 1928 DAVISSON and THOMSON have, with their respective collaborators, greatly extended their epoch-making researches.

To-day the electron diffraction camera ranks with the microscope, the spectrograph, and X-rays as an indispensable unit in the well-equipped chemical or physical laboratory.

In regard to DAVISSON'S numerous publications, we may here mention, as the most important, "Scattering of Electrons by a Single Crystal of Nickel" (jointly with L. H. GERMER, 1927), "Electron Waves" (1928 and 1929), "Electrons and Quanta" (1929), "Scattering of Electrons by Crystals" (1929), and "Wave-Properties of Electrons" (1930).

GEORGE THOMSON

George P. THOMSON was born at Cambridge in 1892; he is the only son of Sir Joseph John THOMSON, formerly Cavendish Professor of Physics and now Master of Trinity College, Cambridge, who, as the actual discoverer of the electron, was awarded the Nobel Prize for Physics in 1906. George THOMSON'S mother was the daughter of the late Sir George PAGET, Regius Professor of Medicine at Cambridge. He was educated at the Perse School, Cambridge, and at Trinity College, where he took first-class honours in the mathematical and natural-science triposes.

In 1914, at the end of his college career, he was appointed Fellow and Lecturer at Corpus Christi College, Cambridge. In the first year of the Great War he saw active service in France with the Queen's Regiment, in which he held a commission; later he was attached to the Royal Air Force for experimental work, and took part in a number of flights to investigate aero-dynamical problems. In 1918 he went to America as a member of the British War Mission. The outcome of his scientific war work was his book on "Applied Aero-dynamics." Returning to Corpus Christi College, he carried out various researches at the Cavendish Laboratory.

In 1922 he was appointed Professor of Natural Philosophy in the University of Aberdeen, where in 1927—28 he did the work in the diffraction of electrons in crystals which was referred to in the Nobel Prize Award, providing a verification of DE BROGLIE'S theory of the electron. The result of these researches was published in the "Proceedings" of the Royal Society (vol. 117, p. 600 and vol. 119, p. 651 in 1928, and vol. 125, p. 352 in 1929). It also formed the subject of a "Friday Evening Discourse" at the Royal Institution.

In 1929 he went to Cornell University, Ithaca, N. Y., for a few months to deliver the Baker Lectures; these were published under the title, "Wave Mechanics of the Free Electron." He continued his research work in America and lectured at the Franklin Institute.

THOMSON became a Fellow of the Royal Society in 1929. In the following year he was appointed Professor of Physics at the Imperial

College of Science and Technology in the University of London, where he has continued to work on electron diffraction with special reference to the study of surface effects.

In 1930 he wrote "The Atom," a short popular account for the "Home University Library," a second edition of which appeared in 1937. He assisted his father, Sir Joseph J. THOMSON, in bringing out a third edition of "Conduction of Electricity through Gases" (vol. 1 in 1928, vol. 2 in 1933).

In 1937 he was appointed by the British Air Ministry to the Advisory Committee for Aeronautics.

II.

BEARERS OF THE PRIZE FOR CHEMISTRY

JACOB HENDRIK VAN 'T HOFF

VAN 'T HOFF, the first to be awarded the Nobel Prize for Chemistry, was born at Rotterdam on August 30th, 1852. He was the son of a physician. Having first studied at the Polytechnic at Delft, he attended the universities of Leyden, Bonn, Paris, and Utrecht, at the last of which he took his doctor's degree in 1874. Already at that time he published a treatise in Dutch on structural formulæ in space, which in the following year appeared in an amplified form in French as "La chimie dans l'espace". In 1876 he became lecturer in physics at the Utrecht Veterinary College, but removed one year later to Amsterdam, where he became first lecturer and soon after (at the early age of twenty-six) professor of chemistry, mineralogy, and geology at the university.

By his maiden work mentioned above, VAN 'T HOFF became the founder of stereo-chemistry, the doctrine of molecular structure in space. His next investigations dealt with chemical dynamics, the results attained being set forth in a collected form in 1884 as "Etudes de dynamique chimique". This work greatly advanced the science of chemical kinetics and that of the equilibrium of homogeneous and heterogeneous systems, while successfully applying thermo-dynamics to the problems of chemistry.

The third important group of VAN 'T HOFF'S endeavours treated of the laws of osmotic pressure, which subsequently led to ARRHENIUS'S theory of dissociation. VAN 'T HOFF formulated these laws in his "Lois de l'équilibre chimique dans l'état dilué, gazeux ou dissous" (1886), of which he furnished a concise outline in his Nobel Lecture in 1901, when the Chemistry Prize was awarded him "in recognition of the extraordinary value of his discovery of the laws of chemical dynamics and of the osmotic pressure in solutions."

In 1890 VAN 'T HOFF explained the conception of solid solutions, later times amply tending to show the frequency of the phenomena connected with this conception.

In 1896 VAN 'T HOFF went from Amsterdam to Berlin, where, as honorary professor at the university, he could devote himself entirely to scientific research and was only occasionally called upon to lecture. His method of work was characterised by a happy combination of experiments with theoretic deliberations.

Several of his writings have been translated into foreign languages. His "Arrangement of Atoms in Space" had reached its third edition in 1908.

VAN 'T HOFF died on March 3rd, 1911.

NOBEL PRIZE for 1902

EMIL FISCHER

Emil FISCHER was born on October 9th, 1852, at Euskirchen in the governmental district of Cologne. Originally intended for a commercial career like that of his father, he turned, in 1871, to the study of chemistry, which he pursued at the universities of Bonn and Strassbourg, taking his doctor's degree in philosophy in 1874. That same year he became assistant instructor at the Strassbourg University laboratory, but soon after accompanied his teacher, Adolf von BAEYER, to Munich, where he was appointed lecturer; in 1879 he advanced to the rank of professor extraordinary, and was entrusted with the task of conducting the analytic department of BAEYER'S laboratory. In 1882 he was summoned as professor-in-ordinary to Erlangen, in 1885 to Würzburg, and in 1892 to Berlin University.

FISCHER'S scientific activity was predominantly in the field of organic chemistry, in which his pioneer achievements rivalled those of his famous preceptor, Adolf von BAEYER.

While still a young assistant-lecturer at Strassbourg, FISCHER discovered the organic hydracines and the influence of phenyl hydracine on aldehyde and ketone. On the strength of this early discovery of his, he was later on able to establish the constitution of the different species of sugar, and to accomplish the synthesis of grape sugar. From the study of the pure varieties of sugar, he passed to that of glycocides, the structure and synthesis of which he succeeded in establishing. A further field of valuable activity he found in the investigation of purine bodies, coffein, theobromine, xanthine, etc., the explanation of which he found in their ultimate syntheses.

FISCHER likewise broke new ground in his investigation of albumen bodies, his methods laying the foundation for the artificial preparation of natural albumins.

Finally, FISCHER did great work in the realms of lichenic and tanning materials, making it possible to accomplish the syntheses of lichenic substances in the one case and of tannin and similar materials in the other.

Jointly with MERING, he discovered a new class of soporifics, including veronal, now extensively used in medicine.

His numerous scientific results, originally set forth in separate treatises, FISCHER later on published in a collected form as „Untersuchungen über Kohlenhydrate und Fermente“, „Untersuchungen über Aminosäuren, Polypeptide und Proteine“, and „Untersuchungen in der Puringruppe“. His „Anleitung zur Darstellung organischer Präparate“ (1901) has run through many editions. A popular outline of his work in regard to sugar was contained in his article on „Die Chemie der Kohlenhydrate und ihre Bedeutung für die Physiologie“. His Nobel Lecture dealt with „Synthesen in der Purin- und Zuckergruppe“.

Emil FISCHER was the second to receive the Nobel Prize for Chemistry, awarded him "in recognition of the extraordinary merit of his synthetic work with relation to the sugar and purine groups."

The new chemical institutes in the universities of Berlin and Würzburg were established on the basis of FISCHER'S plans and directions.

EMIL FISCHER died at Wannsee near Berlin on July 15th, 1919.

SVANTE ARRHENIUS

Svante August ARRHENIUS, born on February 19th, 1859, at Wijk Castle near Uppsala, Sweden, came of a family of farmers established in the northern part of the Kalmar Län ever since the early 17th century. The family name is derived from the Arena district. Several members of this ilk had made a name as professors at Uppsala University, one of them being also known as the author of many popular hymns sung in the Swedish Lutheran churches. Svante's father was an administrator of the university, though occupied in the main with the management of the Wijk estate.

At an early age young ARRHENIUS showed signs of extraordinary endowment, particularly in view of his incredible aptitude in arithmetic. He advanced so rapidly at school that he was soon far ahead of his older classmates, all of whom he excelled in knowledge and intelligence. Mathematics and physics were his favourite subjects. At the university he attached himself especially to Professor Erik EDLUND, under whom he worked at the Physical Institute of the Stockholm Academy of Sciences. In 1884 his first and very valuable work, entitled "Investigations into Electric Conductibility", earned him his doctor's degree at Uppsala, where, when his astoundingly bold inferences, at first mistrusted by many, had been brilliantly confirmed by further investigations on the part of the eminent German scientist OSTWALD, he was permitted, in the very same year, to establish himself as private lecturer in physical chemistry. A travelling scholarship of the Swedish Academy enabled him to get into personal contact with famous men in Germany, Austria, and the Netherlands (OSTWALD, KOHLRAUSCH, BOLTZMANN, VAN 'T HOFF). At Graz he developed his electrolytic theory of dissociation, which greatly contributed to his reputation as an investigator. The universities of Graz and Utrecht negotiated with him in regard to a professorship, but in 1891, after he had declined a flattering invitation on the part of the university of Giessen, he was recalled to Stockholm, there to become instructor, and in 1895 professor, of physics at the newly-founded university of the Swedish capital, of which for five years (1897 to 1902) he also acted as Rector.

It was Thorwald MADSEN, the meritorious head of the Copenhagen Serum Institute, who first drew the rising physicist's attention to a closer engagement in the problems of seral research. From 1900 to 1903 ARRHENIUS devoted himself to this study at the serological institutes of Copenhagen and Frankfort-on-Main. In 1902, on the occasion of the opening of the Danish Serum Institute, he was already able to utter the fundamental rule of immunochemistry, viz., that the formation of toxin and antitoxin must obey the laws of physical chemistry. The results of this research are contained in his works on "Immunochemistry" (London, 1907), "The Quantitative Laws of Biological Chemistry" (in English, London, 1915), and "Smallpox Epidemics" (1923). Meanwhile, the lively interest he took in the physical processes in the universe had resulted, in 1903, in the publication of his "Manual of Cosmic Physics", remarkable in particular for his application of the laws of light-pressure to the explanation of comet phenomena, the solar corona, the aurora borealis, etc.

Invitations to lecture in Paris and New Haven were followed by the award of the Davy Medal by the London Royal Society, by the membership of various learned bodies, and — crowning all such distinctions — by the conferment, in 1903, of the Nobel Prize for Chemistry in view of the special "value of his theory of electrolytic dissociation in the interest of the development of chemistry".

How justified this distinction was ARRHENIUS subsequently proved by his books "Worlds in the Making" (1906), "The Conception of the Universal Structure in the Course of Ages" (1908), and "The Fate of the Stars" (1915), all widely read by reason of their exceptionally lucid and generally comprehensible explanation of physical facts and processes. These books he wrote in Swedish, German, or English with equal facility and mastery of style. In honour of Wilhelm OSTWALD'S 60th birthday, ARRHENIUS published his memoirs, "From My Youth" (1913). As from 1904 ARRHENIUS was himself director of the Nobel Institute for Physical Chemistry at Stockholm, for which, in 1909, he procured magnificent new premises in the so-called "Experimentalfältet" close to the capital.

On the occasion of his own 60th birthday, the fifth volume of the "proceedings" of this institute ("Meddelanden fran K. Vetenskapsakademiens Nobelinstitut") appeared in the form of a jubilee publication, containing a complete list of his writings.

Outside the realm of science, ARRHENIUS'S name will long be gratefully remembered in view of his successful efforts during the war in the interest of the release and repatriation of German and Austrian scientists who had been made prisoners of war.

ARRHENIUS died at Stockholm on October 2nd, 1927.

NOBEL PRIZE for 1904

SIR WILLIAM RAMSAY

Sir William RAMSAY was born at Glasgow on October 2nd, 1852, and studied chemistry, first in his native town and later on at Tübingen, where he took his degree when barely twenty years of age. After working for six years as assistant at Glasgow University, he was appointed professor of chemistry at University College, Bristol, becoming principal in the following year. In 1887 he was elected to the chair of chemistry at University College, London, where he continued to lecture until his retirement in 1913.

Although RAMSAY'S first work was in organic chemistry, in which respect, under FITTIG at Tübingen, he had made a thorough investigation of the bases of pyridine, he soon turned his attention to what was then a new branch of the subject, viz. physical chemistry, of which he became one of the leading exponents. His principal work in this field includes laborious and refined investigations on "evaporation and dissociation", which he carried out chiefly at Bristol in conjunction with Sydney YOUNG, and which led at a later stage to researches on the "molecular surface energy of liquids".

In 1893 Lord RAYLEIGH'S discovery of a difference between the density of the nitrogen got from the atmosphere and that from chemical compounds caused RAMSAY to make investigations which ended in his discovery, jointly with RAYLEIGH, of the element argon, a gas of hitherto unique properties. In search of other possible sources of this substance, he investigated a "nitrogen", said to be emitted by certain minerals, and he discovered in 1895 that it was helium, a gaseous element that had been recognised spectroscopically in the sun but was unknown in terrestrial matter. Subsequently, in collaboration with TRAVERS, he isolated three more gaseous elements, xenon, krypton, and neon, present to a very small extent in the atmosphere. Later on he established that in its apparent disintegration radium evolves helium. Thenceforth, radio-activity engaged his primary attention; the discovery of radio-therium in 1905 may ultimately be attributed to him.

It was his research in the realm of gases that first established his fame as an investigator, and earned him his K. C. B. in 1902, and the Nobel Prize for Chemistry two years later.

Besides these distinctions, he was awarded the Davy and Longstaff Medal, the Barnardo Prize of the Smithsonian Institution, the Hoffmann Medal in gold (Berlin) and other decorations, being likewise elected member of numerous academies.

Most of RAMSAY works were published in the records of the Royal Society and in the "Chemical News" and other periodicals. Of those that appeared in book-form, his "System of Inorganic Chemistry" (1891), "Gases of the Atmophere, the History of their Discovery" (1896), and "Modern Chemistry" (1901) may here be mentioned.

The Nobel Prize was conferred on him in "recognition of his discovering the indifferent gaseous basic materials in the atmosphere and determining their place in the periodic system".

Sir William RAMSAY died at High Wycombe, Buckinghamshire, on July 24th, 1916.

ADOLF VON BAEYER

Johann Friedrich Wilhelm Adolf von BAEYER, born in Berlin on October 31st, 1835, was the son of Lieutenant-General Josef Jakob BAEYER of the Prussian army, known as the initiator of the central European measurement of longitudinal degrees. So prodigious was the interest in chemistry evinced by the boy that at the age of twelve he already discovered a new bisulphide of copper. In his university studies, however, he first went in for physics and mathematics in Berlin, subsequently returning to chemistry, which he studied under BUNSEN at Heidelberg. In 1858 he took his doctor's degree in philosophy in Berlin, where two years later he was appointed teacher of organic chemistry at the "Gewerbeakademie"; in 1868 he became professor extraordinary at Berlin University, and in the following year instructor at the War Academy. After his appointment, in 1872, to a professorship at Strassbourg, he was chosen to succeed LIEBIG at Munich University in 1875.

The scientific importance of BAEYER, an investigator distinguished for his keen perception and pronounced organising talents, is mainly in the field of organic chemistry, his chief sphere of activity. Apart from important investigations in the uric-acid group, numerous condensation reactions, his evolution of a "theory of tensions", and work on the benzole theory and the discovery of the phthaleine class of dyes, it was in particular his syntheses of indole, eosine, and, above all, indigo that made him famous even outside scientific circles. Occupied for wellnigh twenty years with investigations regarding indigo, he first succeeded in 1870 in producing this dye artificially; ten years later he discovered a means of obtaining indigo from o-nitrophenylpropriole acid, and in 1883 was finally able to furnish a full explanation of the constitution of the new dyestuff. This was the first step towards a wholesale production of indigo, though it was only on the strength of HEUMANN'S synthesis that this manufacture was made really practical.

By his ensuing work researches, e. g. in regard to combinations with quadrivalent oxygen, to the phenomena of halochromy, to his theory of tensions, to the benzole theory, to the oscillation of the melting-point in homologous series, as also by the methodics of his greatly admired and widely practised experimental and theoretic processes, BAEYER rose to a leading position in experimental organic chemistry at the close of the past century.

The Nobel Prize was awarded him "in recognition of his services for the development of organic chemistry by his works on organic dyes and the hydro-aromatic combinations".

BAEYER, on whom a patent of nobility was conferred in 1885, was member of numerous academies and other learned bodies. He died at Starnberg naer Munich on August 20th, 1917.

His "Collected Works" appeared in two volumnes in 1905.

Since 1910 the „Verein deutscher Chemiker" has awarded the (gold) "Adolf Baeyer Medal", instituted by the city of Duisburg, to German chemists who have contributed to the development of organic chemistry, this medal being conferred every second year, alternately with the "Emil Fischer Memorial Medallion".

HENRI MOISSAN

Henri MOISSAN was born in Paris on September 28th, 1852. He commenced his scientific studies under FREMY and DEHERAIN at the laboratory of the Natural History Museum, and, in collaboration with DEHERAIN, produced his maiden work on "The Breathing of Leaves in the Dark" (1876). He was thereupon appointed professor at the "Ecole normal supérieure de Pharmacie" and, later on, at the Sorbonne.

MOISSAN was an eminent exponent of anorganic chemistry, which owes to him various valuable discoveries and new methods; at the same time, he was an exceptionally clever experimentalist. He worked at the very highest and lowest temperatures ever attained, and in 1892 constructed his electric stove with which he was able to obtain temperatures of 3500 degrees centigrade.

MOISSAN'S greatest achievement lay in the fact that he succeeded, in 1886, in secreting the element fluor contained in fluor spar and establishing its properties; this element he obtained in the form of a yellowish gas, which, jointly with DEWAR, he then succeeded in reducing to its fluid and solid aggregate conditions. Subsequently, he made further valuable contributions to the knowledge of new fluor combinations.

By dissolving coal in molten iron or silver, and thereupon subjecting it by rapid cooling to a high pressure, he likewise managed to cause carbonic acid to crystallise or, in other words, to produce artificial diamonds, albeit in such small quantities and such diminutive crystals that no practical exploitation of this method could be envisaged, since only quite an insignificant part of the carbonic acid could thus be secreted in the form of diamonds, by far the larger portion being simple graphite. In this connection, however, MOISSAN was able to investigate a number of new carbonic-acid combinations, especially such as occur with metals.

By the aid of his electric stove he succeeded in causing all metals to melt and even to boil and thus in transforming them into a gaseous condition. Similarly, he engaged in obtaining metals out of their combinations, in examining the alloys, and in studying the properties of argon, as also in numerous other chemical problems.

Apart from more than 2000 smaller scientific treatises, MOISSAN wrote a detailed book on fluor, another on his electric stove, and a manual of anorganic chemistry in five volumes, called "Traité de chimie minérale".

MOISSAN was member of the "Institut de France" and of numerous foreign academies and learned societies. When in 1903 the Hoffmann Medal was distributed for the first time it was awarded to him jointly with Sir William RAMSAY.

The award of the Nobel Prize ensued "in recognition of the great value of his investigation and isolation of the element fluor and of his introduction into the service of science of the electric stove that bears his name".

MOISSAN died in Paris on February 21st, 1907.

EDUARD BUCHNER

Eduard BUCHNER was born on May 20th, 1860, at Munich, where his father was a physician and professor of forensic medicine at the university. The doctor's early decease, however, caused his son to be destined for a commercial career. He attended a grammar school and subsequently the Polytechnic, where the problems of chemistry so attracted him that, after working for a short while in a factory, he took up the purely scientific study of chemistry and botany.

From the outset, the principal field of his research was the chemistry of fermentation, in which realm he achieved great results. His very first publication, made while he was still working at the Botanic Institute as a pupil of professor NÄGELI'S, dealt with "The Influence of Oxygen on Fermentations" (1885). The LAMONT Scholarship, awarded him by the university for a period of three years, enabled him to pursue the line of investigation he had commenced.

In 1888 he took his doctor's degree in philosophy at the university of his native town; in 1890 he became assistant in the laboratory of Professor Adolf von BAEYER, and in 1891 lecturer. BAEYER procured him the means to establish and develop a laboratory of his own for the chemistry of fermentation. In 1893 he went to Kiel to conduct the analytic section of the university laboratory, and was also accorded the *venia legendi*, followed in 1895 by the title of professor. One year later he repaired to Tübingen as professor extraordinary of analytic and pharmaceutic chemistry, and in 1898 to the Berlin Agricultural College, where he held a full professorship, also lecturing, as from 1900, at Berlin University. In 1909 he was transfered to the university of Breslau and thence, in 1911, to Würzburg.

In connection with his examination of the fermentation process, mention must also be made of an earlier work of his on the dismemberment of the cells of bran (1893).

BUCHNER'S greatest achievement was his discovery that the alcoholic fermentation of sugar is not dependent on the activity of the bran cells, but is brought about by an enzyme contained therein, the so-called „zymase“. This discovery was demonstrated to scientists in 1897 in various scientific publications. In their complete form the results of these studies were subsequently set forth in the book „Die Zymasegärung“ (Munich, 1903), compiled in collaboration with his brother, Hans BUCHNER, professor of hygiene and bacteriology at Munich University, and with Martin HAHN.

BUCHNER died at Munich on August 12th, 1917, of wounds received in action at the front.

He was awarded the Nobel Prize "for his biologic-chèmical investigations and his discovery of non-cellular fermentation".

NOBEL PRIZE for 1908

SIR ERNEST RUTHERFORD

Sir Ernest RUTHERFORD, discoverer of the decomposition of atoms, was born at Nelson in New Zealand on August 20th, 1871. He studied mathematics and physics at Canterbury College in the University of New Zealand, and commenced his independent physical research with an investigation of the magnetic properties of iron under the influence of high-frequency oscillation. Proceeding to England, he pursued his studies at THOMSON'S Cavendish Laboratory in the University of Cambridge, where, *inter alia,* he investigated the radio-activity of uranium.

In 1898 he was appointed professor of physics at the Mac Gill University of Montreal, the well-equipped physical laboratory of which institution afforded him opportunity for valuable investigations. Here he continued his experimental studies in regard to radio-active bodies, and thus arrived at the discovery of thorium emanation. RUTHERFORD'S work in this direction led not only to the discovery of several radio-active substances but also to the uniform explanation of radio-active phenomena in general.

In 1907 RUTHERFORD was made professor of physics at the University of Manchester. During his stay in America he had lectured, as a guest, at Yale and at the universities of Illinois and California. In 1903 he was awarded the Rumford Medal of the Royal Society.

In addition to his work mentioned above in explanation of radio-active phenomena — work appearing in a collected form principally in his "Cause and Nature of Radioactivity" (in collaboration with F. SODDY), "Radioactivity", and "Radioactive Transformations" — and to very numerous investigations in matters of detail, he achieved two results of outstanding importance: the establishment of present-day atomic physics on an entirely new basis by the so-called RUTHERFORD Model (according to which the atom is composed of a positive electric nucleus and a surrounding miniature planet system of negative electric electrons) and, secondly, the discovery of the destruction of atoms by α-rays.

For his "investigations in regard to the decay of elements and the chemistry of radio-active substances'', he was awarded the Nobel Prize for Chemistry in 1908.

Sir Ernest RUTHERFORD, who had been knighted by King George V., was for several years President of the Royal Society. He died in October, 1937.

WILHELM OSTWALD

Wilhelm OSTWALD was born at Riga, at that time in Russia, on September 2nd (Russian style: August 21st), 1853. He was the son of a cooper. Having studied chemistry at the university of Dorpat, he became assistant at the Physical Institute of that seat of learning in 1875, being later transferred in the same capacity to the Chemical Institute, where he was private lecturer as from 1877. In 1881 he was appointed professor of chemistry at the Riga Polytechnic. Four years later he was summoned to Leipsic to the chair of physical chemistry, which he continued to fill until 1906, though absent for the duration of one term (1904 to 1905) as "exchange-professor" at Harvard University, Massachusetts. At Leipsic OSTWALD may be said to have founded an international school, at which most of the later great physical chemists have been trained.

OSTWALD'S fame rests on his investigations, commenced as far back as 1875, in regard to the laws of chemical affinity, which he thoroughly reformed, and no less on his electro-chemical and other experimental investigations, with special reference to chemical dynamics. He exercised a lasting influence on the development of physical chemistry by his manual and his "Outline of General Chemistry", the former appearing in two volumes from 1884 till 1887, the latter first in 1889, and subsequently in numerous editions.

In regard to other works from his pen, nearly 150 in all, mention should be made in particular of his experimental investigations on the strength of acids and bases, and on the connection between the results thereby attained and electric conductibility. This research led him to the theory of electrolytic dissociation, which is in great part to be ascribed to him, seeing that he contributed thereto his belief in gradual dissociation, the determination of the electrolytic dissociation of water from the acid-alkali series, and many other valuable facts.

OSTWALD, moreover, was founder, and, until 1893, main editor of the well-known collection, "Classics of the Exact Sciences" (now running to 200 volumes). In 1901, together with GOLDSCHEID, he founded the "Annals of Nature Philosophy", in which he replaced the absolute metaphysics of the old nature-philosophy school by his own guiding principle of "energetics". By him the nature-philosophy train of thought was enriched by two new problems, viz., the quest of a fundamental scientific order which would include the principles peculiar to each science, and the influence of inner physiological phenomena on the direction and content of creative power, that is, an energetic psychography of the creative genius.

The name of OSTWALD set its mark on the history of chemistry both before and after the turn of the century; indeed, it still occupies a predominant position therein. The Nobel Prize was awarded him "in recognition of his work on catalysis and for his fundamental investigations in the matter of chemical equilibrium and reaction-velocities".

Ill health, brought on by strenuous study, caused OSTWALD to retire from his professorship in 1906; at his country-house (which he named „Energie"), at Groszbothen, Saxony, he devoted himself to philosophic contemplation and, as from 1918, to the problems of the exact colour theory, leading him to a quantitative measurement of colour-tone and colour-harmony, and thence to the solution of harmony problems in general.

OSTWALD died on April 3rd, 1932.

OTTO WALLACH

Otto WALLACH was born on March 27th, 1847, at Königsberg, East Prussia, studied chemistry at Göttingen and Berlin, and graduated doctor of philosophy at Göttingen. After working as assistant to Professor WICHELHAUS in Berlin and later to Professor KEKULE at Bonn, he was employed for a time as works-chemist by the „Agfa" (Aktiengesellschaft für Anilinfabrikation) at Rummelsburg near Berlin, but soon returned to his former post at Bonn, where he started lecturing in 1873. Having been professor extraordinary of chemistry at Bonn University as from 1876, he accepted a professorship at Göttingen University in 1889, remaining there until his retirement in 1915; at Göttingen he also conducted the Chemical Institute.

In the autobiographical sketch furnished by him for "Les Prix Nobel en 1910", he considers his principal achievements to have been "the transformation of chloral into dichloric acetic acid, the explanation of the constitution of chloralides and their synthesis, a series of studies on amid-chloride, imid-chloride, amidine, oxaline, and glyoxaline, studies on azotic dyes and diazotic combinations, and, finally, extensive investigations, commenced in 1884 and continued since then, in regard to the group of terpenes and alizyclic combinations, the total results of which are collected in a book on „Terpene und Campher" (1909).

In supplementing this list, we may mention his „Tabellen zur chemischen Analyse" (3rd edition, 1898) and his „Forschung und Lehre in der Chemie" (1899). „Terpene und Campher" likewise ran through several editions.

WALLACH was co-editor of the „Annalen der Chemie"; his investigations regarding the constitution of ethereal oils and perfumes gave rise to the powerful development of the respective industries.

WALLACH was honorary doctor of various faculties and member of learned societies and academies.

The Nobel Prize for Chemistry was awarded him "in recognition of what he achieved in the development of organic chemistry and the chemical industry by his pioneer work in the realm of alizyclic combinations".

Otto WALLACH died on March 18th, 1931.

NOBEL PRIZE for 1911

MARIE CURIE

Marie CURIE, née SKLODOWSKA, the wife of Pierre CURIE, was born at Warsaw on November 7th, 1867. She studied first at the Lyceum in her native city and later at the "Faculté des sciences" in Paris. In 1895 she was married to Pierre CURIE and commenced to do independent scientific work in his laboratory; soon, however, she joined forces with her husband for the purpose of those successful investigations, the chief fruit of which was the discovery of radium and polonium, the latter element being so named by her in commemoration of her Polish home.

Marie CURIE succeeded in isolating pure radium salt and in determining the atomic weight and other most important properties of radium.

Professor of physics at the women's college at Sèvres as from 1900, she acquired the title of doctor in 1903, and in the following year became "chef des travaux pratiques" at the "Faculté des sciences" in the Paris University, where she was accorded the rank of professor after her husband's decease.

Her chief publications were the "Recherches sur les substances radio-actives" (1904) and the "Traité de radio-activité" (1910).

In the year 1903 she was awarded the Nobel Prize for Physics, jointly with her husband and with Henri BECQUEREL, and in 1911 the Nobel Prize for Chemistry. The latter award made mention of her labours "for the development of chemistry by her discovery of the basic materials radium and polonium, by her characterisation of radium and its isolation in a metallic condition, and by her investigation of the combinations of this unique basic material".

Marie CURIE-SKLODOWSKA died on July 4th, 1934.

VICTOR GRIGNARD

Victor GRIGNARD, born at Cherbourg on May 6th, 1871, studied in his native town and later on at Lyons, where he devoted himself in the first place to mathematics, but was then induced by his teacher, Philippe BARBIER, to turn his attention to chemistry, in which, after an initial reluctance, he soon took a passionate interest.

As "licencié ès-sciences physiques", he was appointed "chef des travaux" at the early age of twenty-seven. Two years later, he set himself to complete an investigation commenced by BARBIER in the field of organo-magnetic syntheses, in which realm he was to achieve such signal results in the interests of organic chemistry.

The services rendered by GRIGNARD in the development of organic chemistry lie principally in his metallo-organic syntheses according to what has come to be known as the GRIGNARD Reaction, to which a whole series of methods subsequently developed in other chemical laboratories owe their primary incentive.

On the strength of his graduation dissertation "Sur les combinaisons organomagnésiennes mixtes" (1901), GRIGNARD became "chargé des conférences de chimie" at Lyons University, whither he returned in 1906 after lecturing for a while in a like capacity at Bésançon. Appointed professor at Lyons in 1908, he accepted a similar position at Nancy in the following year, but ultimately returned once more to Lyons, where he resumed his activity in 1919.

Numerous distinctions were accorded him, among them the knighthood of the Legion of Honour, conferred immediately before his departure for Stockholm in connection with the Nobel Prize distribution. He was likewise awarded the Berthelot Medal and the Jecker Prize.

The Nobel Prize for Chemistry, which was given him in conjunction with Paul SABATIER, was "for the so-called GRIGNARD Reaction discovered by him, a method that has been highly instrumental in advancing organic chemistry within the last few years".

GRIGNARD died on December 13th, 1935.

PAUL SABATIER

Paul SABATIER, awarded the Nobel Prize at the same time as Victor GRIGNARD, was born at Carcassonne in the French department of Aube on November 5th, 1854. After studying natural sciences, he became assistant to Professor BERTHELOT at the Collège de France. In 1880 he took his doctor's degree with a dissertation "Sur les sulfures metalliques". Appointed professor of chemistry at the "Faculté des sciences" of Toulouse in 1882, he has continued to lecture there, even declining a flattering invitation on the part of the Paris Sorbonne.

SABATIER'S investigations commenced in the field of physical chemistry. His great importance rests mainly on his studies and treatises, published between 1897 and 1912, in regard to the hydration of organic combinations by catalysis with the aid of finely distributed metals, such as iron, copper, cobalt, and more particularly nickel. Besides this, he succeeded, aided by a great number of his pupils, including SENDERENS, MAILHE, and MURAT, in transforming carbon oxide into methane, unsaturated carbo-hydrogens and acids into saturated ones, benzole into cyclo-hexane, and the like. According to the conditions governing the experiment, he was able to gain from acetylene substances similar to American, Canadian, or Caucasian rock-oil.

His work was rewarded by the conferment of the La Caze and Jecker prizes and by his election as corresponding member of various societies. The Nobel Prize was given him "for his method of hydrating organic combinations in the presence of finely distributed metals, which has greatly fostered the progress of organic chemistry of late years".

SABATIER'S treatises were published mainly in the "proceedings" of the French Academy and in chemical periodicals. His book, "La catalyse en chimie organique", appeared in 1913.

NOBEL PRIZE for 1913

ALFRED WERNER

Alfred WERNER was born on December 12th, 1866, at Mulhouse in Alsace. A German subject as from 1871, he did military service at Carlsruhe for one year (1885/86), during which, however, he was able to attend lectures at the Polytechnic; subsequently he continued his studies in the chemical section of the Polytechnic at Zurich, where in 1889 he attained his diploma as technical chemist. Appointed almost immediately assistant in Professor LUNGE'S laboratory, he graduated at Zurich University in 1890 with a dissertation "On the Order in Space of the Atoms in Nitrogenous Molecules". He then completed his training under BERTHELOT in Paris and, in 1892, became lecturer at the Zurich Polytechnic. The next year saw him professor extraordinary, and in 1895 he advanced to the rank of professor of organic chemistry at Zurich University, in which capacity he continued to lecture until his death in 1919.

In his first scientific work, compiled in collaboration with A. HANTZSCH, and carrying on the line of research indicated by the thesis of his maiden dissertation as a lecturer, he dealt with "Stereo-chemistry (Construction in Spaa) of Nitrogenous Molecules". Thereby WERNER became the initiator of the stereo-chemistry of nitrogenous combinations. His most prominent scientific achievement was the "law of co-ordination" set up in 1893, and embodying the conceptions of the co-ordination number, the accessory valence, and the direct and indirect conjunction. This theory of co-ordination furnishes a simple method for classifying anorganic combinations; it also tended to lead WERNER to the geometric and optic isomerism of cobalt, chromium, platinum, iron and rhodium combinations which served as foundations for the stereo-chemistry of metallic combinations. This theory of WERNER'S has not remained undisputed and was destined to suffer some modification, but in various fields of chemistry his modified views have borne fruit. In particular, WERNER'S theory may be said to agree with present-day opinions as to the structure of atoms.

WERNER summed up his views on the space-conditions of molecules in his "Manual of Stereo-Chemistry" (1904), while his theory of affinity, valence, and the constitution of anorganic combinations has been newly set forth in his "New Opinions in the Field of Anorganic Chemistry" (1905); the latter book has gone through several editions and has been translated into English.

Between 1896 and 1912 **WERNER** delivered many lectures to a wider public; a great number of them likewise appeared in print.

The Nobel Prize for Chemistry was awarded him "on the strength of his works on the combination conditions of the atoms in the molecule, serving to illumine old, and to open up new, fields of research, especially within the realm of anorganic chemistry".

WERNER died at Zurich on November 15th, 1919.

NOBEL PRIZE for 1914

THEODORE WILLIAM RICHARDS

Theodore W. RICHARDS, son of the landscape painter William T. RICHARDS, was born at Germantown, Pennsylvania, on January 31st, 1868. His early education was almost entirely in the hands of his mother, who had made a name as a writer of poetical works; it was supplemented by numerous and extensive journeys. Subsequently he studied at Harvard University, where he took his degree in 1888.

In the following year he commenced his scientific career as an assistant-reader at Harvard, and was promoted to a professorship in 1901; as from 1912, he was Erving Professor of Chemistry and Director of the Wolcott Gibbs Memorial Laboratory at Harvard.

In the summer of 1907, RICHARDS went to Berlin University in the capacity of "exchange-professor"; 1908 saw him lecturing in Boston and 1911 in London.

RICHARDS was particularly fortunate in his new determination of the atomic weights of a great number of chemical elements, which he succeeded in establishing with an unprecedented degree of accuracy.

Besides this, he did valuable work in many other fields, in regard to spectra, electric resistance, the heat-expansion of gases, the growth of crystals, compressibility of atoms, etc.

The Nobel Prize for Chemistry was awarded him for "his exact determination of the atomic weights of numerous chemical substances".

RICHARDS died on April 2nd, 1928.

RICHARD WILLSTÄTTER

Richard WILLSTÄTTER was born at Carlsruhe, in the Grand-duchy of Baden, on August 13th, 1872; he studied natural sciences at Munich University, acquiring his doctor's degree in philosophy in 1894, and became lecturer in chemistry; in 1902 he was appointed professor extraordinary and head of the organic department, and in 1905 professor at the Polytechnic of Zurich. From 1912 to 1915 he held the directorship of the „Kaiser-Wilhelm-Institut für Chemie" in Berlin and an honorary professorship at Berlin University. In 1915 he answered a call to his own *alma mater* at Munich, where he occupied the chair vacated by his teacher, Adolf von BAEYER.

His early researches dealt with the synthesis and structural determination of vegetable alkaloids, such as atropine and cocaine; later on he investigated chinones and chinonous combinations forming the basis of dyestuffs. Next he turned his attention to the investigation of vegetable and animal pigments; in the laboratory at Zurich, and more especially in Berlin, he found occasion to carry out many important investigations. Here, supported in part by his collaborators, he was able to carry out his researches in regard to chlorophyll, to the dyestuff of blood, and to the dyestuffs of blossoms and fruits.

It was these investigations of vegetable pigments, with special reference to chlorophyll, that earned him the Nobel Prize in 1915.

Upon his return to Munich WILLSTÄTTER first of all set himself to enlarging his laboratory, a task that was completed by 1920. His subsequent work was devoted in part to technical and in part to physiologic-chemical problems. Starting from his investigation of chlorophyll, he examined the assimilation of carbonic acid in plants, on which subject he published several treatises jointly with his pupil, A. STOLL. Finally, he turned to the chemical investigation of enzymæ.

Among his numerous writings, those that have been published in book-form are his „Untersuchungen über Chlorophyll" (1913), and „Untersuchungen über die Assimilation der Kohlensäure" (1918), both of them compiled in collaboration with STOLL.

The Nobel Prize was awarded him "for his investigation of dyestuffs in the vegetable kingdom, especially of chlorophyll".

WILLSTÄTTER, who retired from his professorship in 1920, still resides at Munich.

FRITZ HABER

Fritz HABER was born at Breslau on December 9th, 1868. He studied chemistry at the universities of Heidelberg and Berlin, enlarging his knowledge by visits to the Polytechnic at Zurich and to Jena University. After working for a while as unpaid junior clerk in various chemical factories, he decided in favour of a scientific career, and became assistant and lecturer at the Polytechnic of Carlsruhe, Baden (1894), where in 1906 he was appointed professor of physical chemistry and electro-chemistry, and director of the Physico-Chemical Institute. In 1911 he was placed at the head of the „Kaiser-Wilhelm-Institut für physikalische Chemie und Elektrochemie" at Dahlem, a suburb of Berlin.

HABER'S main field of activity was technical and physical chemistry. In 1910 he invented a technically practicable process of procuring ammonia synthetically from its elements.

It was for this achievement that he was awarded the Nobel Prize for Chemistry.

His principal publications were „Experimentaluntersuchungen über Zersetzung und Verbrennung von Kohlenwasserstoffen" (1896), „Grundriß der technischen Elektrochemie" (1898), and „Thermodynamik technischer Gasreaktionen" (1905).

Fritz HABER died on February 1st, 1934.

NOBEL PRIZE for 1920

WALTHER NERNST

Walther NERNST was born at Briesen, West Prussia, on January 25th, 1864. He studied physics and chemistry at Zurich, Berlin, Graz, and Würzburg, graduating at the last-named university in 1887. As from this year, he was assistant to Wilhelm OSTWALD at the Physical Chemical Institute of Leipsic University, where he started lecturing in 1889; in the following year he repaired, as assistant and lecturer, to Göttingen, whence he was invited to Giessen in 1890. This call he declined, and in 1891 he was appointed professor extraordinary at Göttingen, where he established an institute for physical and electric chemistry. In 1894 he was invited to succeed BOLTZMANN at Munich University, but again elected to stay at Göttingen and conduct his newly-founded institute. In 1905 he became professor and director of the Institute for Physical Chemistry at Berlin University; since 1922 he has been president of the „Physikalisch-technische Reichsanstalt“ of Berlin-Charlottenburg.

NERNST may be considered the founder of modern physical chemistry. Among his numerous achievements, the determination of specific heats at very low temperatures, and his method for determining the di-electric constants and their influence on electrolytic dissociation deserve special mention.

NERNST'S fame rests principally on his establishment, in 1906, of a new main tenet of the theory of heat; this principle, which now bears his name, may be said to lie in the fact that, at enormously low temperatures, only a few degrees above absolute freezing-point, most of the thermo-dynamic conceptions forfeit their ordinary significance, so that, e. g., the access of a quantity of heat hardly capable of warming a body perceptibly at room-temperature, will, at extremely low temperatures, cause a remarkable increase in temperature, or that, conversely, the access of a greater quantity of heat, entailing a substantial growth in volume at room-temperature, will fail to occasion any perceptible expansion of a body at these very low temperatures. This new knowledge in regard to heat has caused the problems of chemical affinity to be envisaged from an entirely new viewpoint and may, in its manifold applications, be looked upon as the most important principle of latter-day thermo-dynamics, of the greatest significance for both chemistry and physics.

In connection with this principle we have, furthermore, NERNST'S thermo-dynamic theory of galvanic elements.

In the year 1898 NERNST invented the famous lamp which has made his name known even outside the scientific world.

In regard to his writings, special mention may be made of „Theoretische Chemie“ (1893, and in many subsequent editions), „Einführung in die mathematische Behandlung der Naturwissenschaften“ (jointly with A. SCHÖNFLIES, 1895), „Die theoretischen und experimentellen Grundlagen des neuen Wärmesatzes“ (1918), and „Das Weltgebäude im Lichte der neueren Forschung“ (1921).

The Nobel Prize was awarded him "in recognition of his thermochemical work".

NERNST lives in Berlin.

FREDERICK SODDY

Frederik SODDY was born at Eastbourne in Sussex on September 2nd, 1877. He studied chemistry at Oxford, where he graduated in 1898. After two further years' study at Oxford he went to Canada, where, until 1902, he was demonstrator at the Chemical Institute of the Mac Gill University, Montreal. Here, in collaboration with Ernest RUTHERFORD, he commenced his research on radio-activity which led to the establishment of the theory of atomic decay.

From 1903 to 1904 he was working with William RAMSAY in London, where they succeeded jointly in gaining helium from radium.

For the following ten years SODDY lectured on physical chemistry and radio-activity at Glasgow University, and subsequently on chemistry at Aberdeen. Since 1919 he has been professor of chemistry at Oxford University.

In his laboratory SODDY and his collaborators systematically investigated the chemical character of radio-active elements; the results of his work in radio-activity he published in a collected form in his "Chemistry of the Radio Elements and the Periodic Law" (1914). A popular exposition of the theory of atomic decay had already appeared in 1908 by his "Interpretation of Radium", a book that has since run through numerous editions and been translated into all civilised languages. To the edition of 1920 SODDY added a chapter on the structure of atoms. Other publications of his are "Matter and Energy" (1910) and "Science and Life" (1920), the latter being a collection of the academic discourses and addresses delivered by him on different occasions.

He was awarded the Nobel Prize "for his contributions to the knowledge of the chemistry of radio-active substances and his investigations on the occurrence and nature of isotopes".

FRANCIS WILLIAM ASTON

Francis W. ASTON was born at Harborne near Birmingham on September 1st, 1877, and studied chemistry at the university of Birmingham, where he devoted himself at first to the chemistry of fermentation and later to physical experiments on electric discharge in gases. In 1909, soon after the establishment of a new laboratory at Birmingham University, he was appointed professor extraordinary there, but repaired at the close of the same year to Trinity College, Cambridge, to work with Sir J. J. THOMSON at the Cavendish Laboratory.

During the war ASTON acted as technical head of the Royal Aircraft Factory at Farnborough, but in 1919 he returned to the Cavendish Laboratory, where he is still engaged.

ASTON has acquired particular distinction by his invention of the "mass spectrograph", which he succeeded in constructing in 1919 and made public in the following year.

By analysing the canal rays in his mass-spectrograph, he discovered the isotopy of non-radioactive elements. It was this pioneer discovery that was mainly conducive to his selection for the Nobel Prize for Chemistry.

In addition, he was distinguished by the award of the Mackenzie-Davidson Medal for 1920 of the Röntgen Society and of the Hughes Medal for 1922 of the Royal Society, of which latter society he is a member. ASTON is an honorary doctor of Birmingham University.

The results of his research work appeared in his book "Isotopes" (1922).

The Nobel Prize was awarded him "for his discovery of the conduct of isotope mixtures in many non-radioactive basic materials and his discovery of the so-called law of complete numbers".

NOBEL PRIZE for 1923

FRITZ PREGL

Fritz PREGL was born on September 3rd, 1869, at Laibach in the Austrian town of Carniola (now Liubliana in Yugoslavia). He studied medicine at the university of Graz, where he took his M. D. degree in 1893, having already as an undergraduate acted as assistant to Professor ROLLETT, lecturer on physiology and histology. Meanwhile his interest also extended to chemistry. In 1899 he became a lecturer in physiology at Graz, on ROLLETT'S demise in 1903, and provisionally occupied his chair for one year. Having, furthermore, supplemented his knowledge of chemistry by studies at the chemical institutes of the Tübingen, Leipsic, and Berlin universities, he became assistant at the medical-chemical institute of his own university at Graz, where he simultaneously attained the rank of professor extraordinary. From 1910 to 1913 he was professor at Innsbruck University, being thereupon recalled to Graz in the same capacity.

PREGL'S early scientific work was mainly in the physiologic and physiologic-chemical fields, whence he passed over to problems of chemical constitution, with special reference to the study of gall-acids. He next conceived and developed methods of quantitative organic micro-analysis, the fundamentals of which he first exposed at the meeting of German naturalists and physicians, held in Vienna in 1913. By these methods, medical chemistry was enabled to solve new problems, added to which the so-called PREGL Process is characterised by extreme precision and an economy of time and materials. It is thus of equally eminent value both for pure science and for industrial purposes. PREGL'S methods of quantitative micro-chemical analysis constitute the greatest step forward since the invention of organic elementary analysis in general.

PREGL, on whom the Lieben Prize had been conferred by the Vienna Academy in 1914 and the degree of honorary doctor of philosophy by Göttingen University in 1920, was awarded the Nobel Prize "for the micro-analysis of organic substances initiated by him".

PREGL died on December 13th, 1930.

NOBEL PRIZE for 1925

RICHARD ZSIGMONDY

Richard ZSIGMONDY, the son of a medical practitioner, was born in Vienna on April 1st, 1865, studied chemistry at the universities of Vienna and Munich, graduated in philosophy in 1889, and worked for the next three years as assistant, first to Professor von MILLER at Munich and then to Professor KUNDT in Berlin. In 1893 he started lecturing at the Graz Polytechnic. From 1897 to 1900 he was scientific collaborator in the vitreo-technical laboratory of the firm of Schott & Co., Jena, a position he ultimately quitted in favour of private research. In 1907 he was appointed professor of organic chemistry and colloido-chemistry in the university of Göttingen, and at the same time director of the Institute for Organic Chemistry attached to that seat of learning; here he continued to work until his death in 1929.

ZSIGMONDY commenced his very fruitful scientific researches with the technical production of lustre-dyes for glass and porcelain. It was the observations he made in this connection of the tingeing of the residual embers that conducted him to his main field of research, colloido-chemistry. In a lecture delivered in 1898 at the main assembly of the „Deutsche Elektrochemische Gesellschaft“ at Leipsic he first made mention of colloidal gold; by mixing acid solutions of colloidal gold and tin he succeeded in producing what is known as CASSIUS'S gold-purple, which he thus proved to be no chemical combination. In his subsequent pursuit of this matter he dealt with the precipitability of colloidal-gold solutions by organic fluids, with the production of equipartite gold solutions and their reaction to albumins, etc.

While at Jena he collaborated with the physicist SIEDENTOPF in constructing the ultra-microscope, which he was thus able to describe in detail at the meeting of the „Deutsche Elektrochemische Gesellschaft“ at Würzburg in 1902. This instrument, which, at Göttingen in 1913, he developed into the yet more accurate “immersion ultra-microscope”, has come to be the most important implement in colloidal research.

In the problem of the rapidity of coagulation by means of electrolytes, it was ZSIGMONDY who furnished the incentive for the investigations of SMOLUCHOWSKI. Jointly with HÜCKEL, he examined the rapidity of the formation of colloidal solutions from gold solutions by reductional means. As from 1911 he did successful work, partly in collaboration with his pupils, in regard to the structure of gels.

Besides the ultra-microscope mentioned above, chemistry owes to ZSIGMONDY various other practical inventions: thus his star-dialysator has helped to improve dialysis, while his membrane-filter (1918) and his ultra-fine filter (1922) have promoted ultra-filtration.

His principal publications, apart from those on CASSIUS'S gold-purple, the absorption of light by coloured glass, the ultra-microscope (together with SIEDENTOPF), and the technical analysis of gases (with JANDER, 1920), were „Zur Erkenntnis der Kolloide“ (1905), „Kolloidchemie mit besonderer Berücksichtigung der anorganischen Kolloide“ (1907), and his book „Kolloidchemie“ (1912), which has appeared in many, partially revised, editions. ZSIGMONDY likewise published a collection entitled „Kolloidforschung in Einzeldarstellungen“.

ZSIGMONDY was honorary doctor of the Vienna Polytechnic and of Königsberg University, as also member of numerous academies.

The Nobel Prize was awarded him “for the exposition of the heterogeneous nature of colloidal solutions and for the methods employed in this connection, methods that have proved of fundamental importance to modern colloidal chemistry”.

ZSIGMONDY died at Göttingen on September 24th, 1929.

NOBEL PRIZE for 1926

THEODOR SVEDBERG

Theodor SVEDBERG was born on August 30th, 1884, at Valbo, Gävleborgs Län, Sweden, and studied at Uppsala University; here he graduated in 1908, by which time he had already been lecturer in chemistry for several months, besides working as assistant at the Chemical Institute. Soon ofter graduation, for the sake of broadening his knowledge, he visited Germany, and later on Holland and France. From 1909 to 1912 he held a university appointment as instructor in physical chemistry and supervisor of practical exercises in experimental chemistry. Since 1912 he has been professor of physical chemistry at Uppsala.

On his various journeys he studied the methods and appointment of the chemical institutes in other countries, visiting Berlin in 1913, Vienna in 1916, London and Paris in 1920, various laboratories in England and Denmark in 1922, and similar institutions in the United States and Canada in the following year.

SVEDBERG'S chief merit rests on his fundamental work in connection with the physical chemistry of colloids, in which respect special mention must be made of his book, "Colloido-Chemistry", published in 1924 and reprinted four years later, of his treatise on "Methods of Producing Colloidal Solutions of Anorganic Materials" (1927), and, among his earlier publications, of "The Existence of Molecules" (1910), "Matter" (1912), and "The Decadence of Work" (1915).

For "his writings on dispersive systems", he was awarded the Nobel Prize for Chemistry in 1926.

NOBEL PRIZE for 1927

HEINRICH WIELAND

Heinrich Otto WIELAND was born of old Swabian stock at Pforzheim, in the Grandduchy of Baden, on June 4th, 1877. He studied chemistry at the universities of Munich and Berlin and at the Stuttgart Polytechnic, taking his doctor's degree in philosophy at Munich in 1901. Three years later, he started lecturing in chemistry at the same university, where in 1909 he was appointed professor extraordinary, and in 1913 head of the organic section of the state chemical laboratory. From 1917 to 1918 he worked at the „Kaiser-Wilhelm-Institut für Chemie" at Berlin-Dahlem, though in the former year he had been offered a professorship in chemistry at the Munich Polytechnic, an appointment he subsequently held until 1921; he then repaired, in the same capacity, to the university of Freiburg in Baden, and is at present professor of chemistry at Munich University, where he succeeded WILLSTÄTTER in 1925.

WIELAND'S main field of activity is that of organic chemistry in which he has in particular investigated the nitrogen combinations, the alkaloids, and gall-acids; he has likewise devoted much attention to biochemistry.

The Nobel Prize was awarded him "principally for his researches on the gall-acids and on the constitution of substances most intimately akin thereto".

ADOLF WINDAUS

Adolf WINDAUS was born in Berlin on December 25th, 1876, studied medicine at Freiburg-im-Breigau and in Berlin, and passed his prefinal medical exam ("physicum") in Berlin in 1897; at the same time he devoted much attention to physical, chemical, and zoological problems, and worked for a year at the chemical laboratory of Freiburg University, where he took his doctor's degree in 1900. In 1903 he commenced lecturing there with a dissertation on the cholesterin. Ten years later he was appointed professor of applied medical chemistry at the university of Innsbruck, and in 1915 professor, and simultaneously director of the chemical laboratory at Göttingen University.

In this dual capacity he has since then been working at Göttingen.

The scientific field of Professor WINDAUS'S activity is that of experimental chemistry.

Following his earlier work on the cholesterin, he later investigated the sterins, digitalis-glycosides, and similar cardiac poisons, as also colchicine and in particular imidazoles.

WINDAUS'S investigations regarding the chemical nature of foodstuffs proved of special importance for the question of vitamins, which have been the object of so much interest in the last two decades.

The Nobel Prize was conferred on him "for his work in investigating the constitution of sterins and their connection with the vitamin group".

NOBEL PRIZE for 1929

ARTHUR HARDEN

Arthur HARDEN, whose research work has been mainly in the field of the chemistry of fermentation, may be considered one of the most prominent British chemists of the present day.

Born in Manchester on October 12th, 1865, he studied there under Sir Henry ROSCOE and at Erlangen under Otto FISCHER, taking his Ph. D. degree at the latter university in 1888. For the following nine years he was lecturer and demonstrator in chemistry at Queen's College, Manchester; thereupon he was appointed chemist in the newly-founded British Institute of Preventive Medicine (subsequently known as the Lister Institute), where he was soon after entrusted with the administration of the biochemical section. At the same time he was made professor of biochemistry in London University.

At an early age HARDEN occupied himself with the chemical effects of bacteria; since 1903 he has devoted special attention to the problems of alcoholic fermentation. In 1905 he made the significant discovery that by means of ultra-filtration BUCHNER'S compression-juice could be divided into cozymasis and a residue which later came to be known as apozymasis. Thus the complex character of zymasis was first established; this made it possible at a later date to determine its composition by a number of part-enzymæ, and to demonstrate that such a division of the complex zymasis into ferment and co-ferment also occurs in other instances, especially when the sugar-splitting enzymæ akin to zymasis are found to act in other cells, e. g. in bacterial or animal cells.

In collaboration with YOUNG, HARDEN showed that fermentation may be enhanced by the accession of anorganic phosphates. He thereupon explained the composition of combinations of sugar with phosphoric acid, and established the theory that "the increase in fermentation and, furthermore, the ensuing alcoholic fermentation in general, are to be explained by the assumption that of every two molecules of sugar one molecule ferments, while the other is diphosphorylised" (cf. M. Jacoby, „Chemikerzeitung", 1929, p. 945).

The research of HARDEN who, like EULER-CHELPIN, also engaged profoundly in the study of vitamin problems, contacts intimately with that of the latter scientist particularly as regards fermentation processes: jointly they have investigated and explained the initial processes of the transformation of sugar.

Besides numerous treatises, published in scientific periodicals, Professor HARDEN has compiled books on "Alcoholic Fermentation", "A New View of the Origin of Dalton's Atomic Theory" (jointly with ROSCOE), "Inorganic Chemistry for Advanced Students", and an "Elementary Course of Practical Organic Chemistry" (jointly with F. C. GARRETT).

Since 1909 HARDEN has been member of the Royal Society, and since 1912 co-editor of the "Biochemical Journal".

The Nobel Prize for Chemistry (1929) was awarded him and Professor von EULER, "for investigating the fermentation of sugars and the enzymæ acting in this connection".

Professor HARDEN lives in London.

HANS VON EULER-CHELPIN

Hans Karl August Simon von EULER-CHELPIN, son of General Karl von EULER-CHELPIN of the Bavarian Army, was born at Augsburg, Swabia, on February 15th, 1873. He studied in Berlin, at Göttingen under NERNST, and at Würzburg, subsequently working in the laboratory of Svante ARRHENIUS at Stockholm. When he had taken his degree he started lecturing in 1898 as instructor in physical chemistry at Stockholm University, where in 1906 he was appointed professor of general and organic chemistry.

EULER has made investigations in the realms of physical, anorganic, organic, and physiological chemistry; his main sphere of activity, meanwhile, has been biochemistry and the chemistry of fermentation.

EULER brought the processes of sugar fermentation and enhanced fermentation, as explained in particular by HARDEN, into line with the laws and methods of physical chemistry. He likewise succeeded in establishing the existence of cozymasis, which to many had been a matter of doubt.

EULER also turned his attention to vitamin research, and finally managed to determine that carotin gained from beets is the most powerful of all vitamins.

His more important publications are „Die qualitative chemische Analyse“ (1907), “Växtkemi” (“Plant Chemistry,” in two parts, 1907), „Grundlagen und Ergebnisse der Pflanzenchemie“ (1908/09), and his „Chemie der Enzyme“ (1910), a book that has become indispensable to fermentation chemists; the first volume appeared in 1926 and the second and third volumes one year later. An earlier work from his pen was „Chemie der Hefe und der alkoholischen Gärung“ (1915).

EULER is member of numerous academies and other learned societies. The Nobel Prize was awarded him (together with Professor HARDEN) “for investigating the fermentation of sugars and the enzymæ acting in this connection”.

HANS FISCHER

Hans FISCHER was born at Höchst, on the river Main, on July 27th, 1881, and went to school at Stuttgart and Wiesbaden, matriculating at Easter-time, 1899. He thereupon studied chemistry and medicine simultaneously, first at Lausanne and later at Marburg, Hesse. At the latter university (under ZINCKE), he graduated in chemistry in 1904; two years later he passed his medical state-examination in Munich, and after a further two years his doctor's examination (under von MÜLLER). He then worked and studied for some years at the second medical clinic in Munich, and later at the first chemical institute in Berlin (under Emil FISCHER), returned to Munich in 1911, and started lecturing there on internal medicine in the following year. In 1913 he was appointed to FRANK'S physiological institute in succession to WEINLAND; here he was soon admitted as a lecturer on physiology as well. In 1916 he was invited to succeed WINDAUS as professor of medicinal chemistry at Innsbruck University, whence he proceeded in the same capacity to Vienna two years afterwards. Since 1921 he has been professor of organic chemistry, in succession to WIELAND, at the Munich Polytechnic.

FISCHER'S scientific work deals with the constitutional explanation of blood and gall dyes, as also with the chemistry of pyrrole. The latter field he has investigated principally with a view to the synthetic treatment of the natural pyrroles and their kin.

It is for these investigations and for his synthesis of hæmin that he was awarded the Nobel Prize.

NOBEL PRIZE for 1931

CARL BOSCH

Carl BOSCH was born at Cologne on August 27th, 1874. He studied foundry-work and engineering at the Charlottenburg Polytechnic, but in 1896 turned his attention entirely to chemistry, terminating his studies at Leipsic University (under J. WISLICENUS) with a graduation thesis on a matter of organic chemistry.

In April 1899 BOSCH started work as a chemist in the "Badische Anilin und Soda Fabrik" at Ludwigshafen on the Rhine, where he immediately found occasion to take an active part in the great progress then realised in the young industry of synthetic indigo. Soon advancing to a more independent position, BOSCH took up the question of nitrogen combination, which was the focus of chemical interest in the early years of the present century; his first attempts were made by way of metal-cyanides and nitrites. In 1907 he erected a factory for the production of barium-cyanide.

His main field of activity, however, opened up when, in 1908, the "Badische Anilin und Soda Fabrik" adopted the catalytic high-pressure synthesis of ammonium discovered by Professor F. HABER of Carlsruhe. This invention BOSCH was commissioned to develop into a technical process on a large scale. This involved the question of providing suitable apparatus, and finding resistible working-materials for what was then a completely new method of working under heavy gas-pressure and at the same time at great reaction-temperatures. Furthermore, HABER'S expensive and unpracticable catalysators, osmium and uranium, had to be replaced by a cheap and easily accessible material of contact made of pure iron with certain additions. Solutions had to be found for innumerable technical difficulties, and above all for the problem of a safe and economic control. It was found possible, moreover, to produce cheaply and in a pure condition both nitrogen and hydrogen, the two gases requisite for the ammonium synthesis, out of the crude gases of prime importance for Germany, viz. hydrogen gas and generator gas. Advancing step by step BOSCH thus created the industry of synthetic ammonia according to the high-pressure process. There followed the second complicated task, that of making the ammonium gas thus obtained utilisable for technical and agricultural purposes. The oxidisation of ammonia to saltpetre acid by means of air was effected on a liberal scale by a new catalysator; a synthetic production of urin-matter from ammonia and carbonic acid under heavy pressures was developed; and a series of processes was elaborated for the preparation of suitable nitrogenous fertiliser salts, mixed and pure fertilisers for the various needs of agriculture.

The nitrogen works at Oppau were put into operation in 1913, followed in 1917 by the yet greater Leuna-Werke near Merseburg, Here, subsequently, two productions were initiated which attained worldwide importance, the methanol synthesis and the hydration of coal, tar, and naphtha into benzine; for this purpose the apparatus and processes employed in the ammonia synthesis could be adapted, so that the use of the new highpressure technics in the chemical industry developed beyond expectation.

In 1919 BOSCH was made general manager of the "Badische Anilin und Soda Fabrik," and in 1925 chairman of the board of directors of the "I. G. Farbenindustrie" concern. Ten years later he retired from this position to occupy the chair on the supreme board of control of the said company.

On important economic issues BOSCH has repeatedly come to the fore, both by publications and as expert adviser to the government. He is honorary doctor of several German universities and technical colleges, and has been accorded numerous distinctions by academies and other scientific associations. Thus he received the Liebig Medal from the „Verein deutscher Chemiker," the Bunsen Medal from the „Deutsche Bunsengesellschaft," the Grashof memorial medallion from the „Verein deutscher Ingenieure," and the Siemens Ring from the „Siemens Ring-Stiftung" in Berlin.

In regard to his publications we may mention „Über die stickstoffhaltigen Düngemittel" (1919), „Mitteilungen über die Verarbeitung des Ammoniaks auf Düngesalze" (1918), „Der Stickstoff in Wirtschaft und Technik" (1920), „Sozialisierung und chemische Industrie" (1921), „Zukunftsprobleme der chemischen Großindustrie" (1921), and „Über die Produktions- und Absatzverhältnisse der I. G. Farbenindustrie" (published by the research-committee for the German chemical industry, 1930).

BOSCH was awarded the Nobel Prize in 1931 for his "services regarding the invention and development of chemical high-pressure methods."

FRIEDRICH BERGIUS

Friedrich G. BERGIUS, son of a manufacturer, was born at Goldschmieden, near Breslau, on October 11th, 1884. He comes of an old German family, which has produced various men of great prominence in the annals of science.

BERGIUS studied physical chemistry under ABEGG and LADENBURG at Breslau and under HANTSCH at Leipsic, graduating at the latter university with a paper on „Über absolute Schwefelsäure als Lösungsmittel." He then worked under NERNST in Berlin and under HABER at Carlsruhe. In 1909 he was admitted as a lecturer to the technical college of Hanover on the strength of a dissertation on „Die Anwendung hoher Drucke bei chemischen Vorgängen und eine Nachbildung des Entstehungsprozesses der Steinkohle." At Hanover he installed a laboratory of his own, his field of research comprising principally the study of coal and of reactions under high pressures. The first results of this research, i. e. the development of a method making it possible to imitate the geological formation of coal in a laboratory, were published by Wilhelm KNAPP at Halle in 1912.

In 1913 BERGIUS quitted the Hanover technical college to join the firm of Th. GOLDSCHMIDT at Essen, in which he conducted the scientific laboratory, and very soon was co-opted to the board. Three years latter the coal-research laboratory was removed to Mannheim-Rheinau. On the strength of results obtained a semi-technical experimental plant was established there, by which the process of coal-liquefaction was developed and perfected. In 1927 an important technical plant for the production of liquid fuel from coal was erected by the "I. G. Farbenindustrie" at the Leuna-Works near Merseburg; it has since then been considerably enlarged and is putting more and more products on the market. According to recent official reports, a significant recession is already observable in the imports of foreign working-materials.

When definite satisfactory results had been obtained in the process of coal-liquifaction, BERGIUS started (on the Goldschmidt premises in 1916) to develop a technical method for the transformation of wood into carbon-hydrate cattle-feed. The chemical reaction underlying this process had been invented by Professor WILLSTÄTTER. It was so far developed, first at the Goldschmidt works at Essen, then at Mannheim-Rheinau, and finally in a large technical plant in Geneva, that it was possible to apply the method on a large technical scale. Negotiations are at present in process for the establishment of an initial factory for this production in Germany.

Dr. BERGIUS now lives at Heidelberg; in the capacity of honorary senator he is in close contact with the university, which, in 1927, promoted him honorary doctor of the philosophical faculty in recognition of his work in the field of coal-liquifaction.

The Nobel Prize was awarded him, conjointly with Carl BOSCH, for his "services regarding the invention and development of chemical highpressure methods."

IRVING LANGMUIR

Irving LANGMUIR was born in Brooklyn, New York, on January 31st, 1881. His early education was obtained in Brooklyn, but in 1892 he went with his parents to Paris, where he attended French schools for three years. Returning to America in 1895, he entered Chestnut Hill Academy, Philadelphia. The following year he returned to Brooklyn to study at Pratt Institute School and later at the School of Mines at Columbia University, from which he graduated in 1903 with the degree of metallurgical engineer. He then took up post-graduation work at Göttingen under Professor NERNST, being awarded the M. A. and Ph. D. degrees in 1906; his major subject had been physical chemistry.

Once more returning home, LANGMUIR became instructor in chemistry at Stevens Institute of Technology, Hoboken, New Jersey, where he taught until July, 1909; he then entered the research laboratory of the General Electric Company at Schenectady, where he is at present associate director.

LANGMUIR'S researches have been conducted in the fields of chemistry, physics, and engineering, and have largely been the outcome of studies of vacuum phenomena. In attempting to derive the atomic and molecular mechanisms of these chemical and physical phenomena, he has been led to make fundamental investigations of the properties of absorbed films on surfaces, and of the nature of electric discharges in high vacuum and in gases at low pressures.

In connection with studies of filaments in gases, he investigated the heat loss by conduction and convection from wires and from plane surfaces. This led to the invention of the gas-filled incandescent lamp, now used for all except the smallest lamps, and to the discovery of the atomic form of hydrogen which he latter used in the development of the atomic hydrogen process for welding metals.

He found that very stable monatomic absorbed films were often formed on tungsten or platinum filaments in contact with gases. This suggested that, in general, absorbed films should consist of single layers of oriented molecules. To test this, he experimented with oil films on water, and developed a general theory of absorbed films. Investigations of pure electron currents in high vacuum and, later, electric discharges in gases at low pressures led to the discovery of the importance of space-charge effects. LANGMUIR has published many fundamental papers in these fields. These researches have resulted also in many technical developments, such as modern vacuum tubes, the Coolidge X-ray tube, the kenotron, the thyratron, and the modern type of vacuum tube used in radio engineering.

These studies of vacuum phenomena were greatly helped by his discovery of the high-speed mercury-vapour vacuum pump (condensation pump).

His interest in the mechanism of chemical reactions led him to studies of atomic structure and chemical valence, and he contributed to the development and applications of the LEWIS theory of shared electrons.

Dr. LANGMUIR has been the recipient of distinguished honours in the fields of chemistry, physics, and engineering. Among the awards made to him have been the Nichols Medal, given by the New York section of the American Chemical Society and presented to him in 1915 and again in 1920, the Hughes Medal of the Royal Society in London (1918), the Rumford Medal of the American Academy of Arts and Sciences (1921), the Cannizzaro Prize, awarded by the Royal National Academy of the Lincei in Rome (1925), the Perkin Medal, presented by the American section of the Society of Chemical Industry (1926), the School-of-Mines Medal by Columbia University (1929), the Chandler Medal (1929), The Willard Gibbs Medal (1930), the Popular Science Monthly Award (1932), and the Nobel Prize in Chemistry (1932), the last-named "for his discoveries and researches within the realm of surface chemistry."

HARALD CLAYTON UREY

Harald Clayton UREY, grandson of Indiana pioneers, was born at Walkerton, Indiana, on April 25th, 1893. His father, a clergyman, died when the boy was six years of age, and he received his education through the help of his mother and his stepfather, who was likewise in holy orders. Having attended various schools in Indiana, from the last of which he graduated in 1911, he taught for three terms in country schools, one in Indiana and two in Montana. In 1914 he entered the University of Montana, where he took his B. Sc. degree in 1917. When the United States entered the World War he went to Philadelphia to help manufacturing war materials. This experience he regards as most fortunate, for it convinced him that industrial chemistry was not to be his major interest, and definitely directed him towards academic work. At the close of the war he became an instructor in chemistry at his own university, and in the fall of 1921 went to the University of California to prepare for his doctorate under the inspiring influence of Professor Gilbert N. LEWIS. His dissertation, dealing with the calculation of entropies of diatomic gases from molecular-spectra data and with the equilibrium distribution of hydrogen atoms among the steady states, was the first paper in this field of work in the University of California and directed his interest to problems of atomic structure.

In 1923 he went to Denmark as an American-Scandinavian Foundation Fellow, and spent a year in Copenhagen at the Institute for Theoretical Physics, conducted by Niels BOHR. This was a valuable year for him and was also rendered pleasant by the cordial hospitality of the Danish people. He returned to America and became an Associate in chemistry at Johns Hopkins University, which position he held until February, 1929, when he was appointed associate-professor of chemistry at Columbia University, advancing to the rank of professor in 1934.

While at Johns Hopkins and Columbia universities he co-operated with Professor Arhur E. RUAK in compiling a book on "Atoms, Molecules, and Quanta," published in 1930. His research has dealt with problems in the border-line field between chemistry and physics, the kinetics of reactions, absorption spectra and RAMAN spectra. In 1931 he devised a method for the concentration of any possible heavy hydrogen isotopes by the fractional distillation of liquid hydrogen. The experimental work following this was highly successful, and in December 1931 the discovery of the hydrogen atom of atomic weight 2 was announced. UREY was associated with the late Dr. E. W. WASHBURN in the discovery of the electrolitic method for the separation of the hydrogen isotopes. His work on the hydrogen isotope has dealt with its thermo-dynamic properties and those of its compounds, in particular the vapour-pressure of hydrogen and deuterium and the equilibrium constants of exchange reactions.

He is editor of the Journal of Chemical Physics, a member of the American Association for the Advancement of Science, of the American Chemical Society, and a Fellow of the American Physical Society. He has been awarded the Willard Gibbs Medal by the Chicago section of the American Chemical Society (1934), and the Nobel Prize "for his discovery of heavy hydrogen."

NOBEL PRIZE for 1935

FRÉDÉRIC JOLIOT

Frédéric JOLIOT was born on March 19th, 1900. He went in for technical studies, and in 1923 secured a diploma as an engineer from the Paris Institute for Physics and Chemistry. Working as a preparator under Marie CURIE at the Paris Radium Institute, he became acquainted with her daughter, Irène CURIE, who was employed there in the same capacity; they were married on October 9th, 1926. In the following year JOLIOT graduated "licencié ès-sciences," and in 1930 "docteur ès-sciences." Since 1935 he has been "maître de conférence" at the Radium Institute.

His most important scientific work commenced with investigations regarding the α-rays of radio-elements and their recession; there followed electro-chemical investigations of radio-active elements, which formed the subject of his graduation thesis in 1930. His subsequent work was all done in collaboration with his wife, for which reason the Chemistry Prize for 1935 was awarded them jointly by the Nobel Committee.

IRÈNE JOLIOT-CURIE

Irène JOLIOT (née CURIE) was born on September 12th, 1897. She is the daughter of Pierre CURIE and Marie CURIE-SKLODOWSKA, both of them professors at the "Faculté des Sciences" in Paris and both destined to gain the Nobel Prize award, conferred on them jointly for physics in 1903, and on Marie CURIE for chemistry in 1911.

Carrying on the brilliant scientific traditions of her parents, Irène CURIE studied physics and mathematics from 1914 to 1920, worked as her mother's assistant in the CURIE laboratory of the Radium Institute, acquired her doctor's degree in 1925, and in 1932 herself took charge of the work at the Institute. Her graduation thesis was "Recherches sur les rayons alpha du polonium." In 1932 she discovered, jointly with her mother, the phenomenon of the projection of atomic nuclei by neutrons; in the following year the two of them, together with Frédéric JOLIOT, established the conditions in which positive electrons develop by means of γ-rays of great quantum-energy, and in 1934 succeeded in artificially producing radio-active elements, thus furnishing proof of the possibility of transforming elements.

For this last-named achievement, Irène JOLIOT-CURIE was awarded the 1935 Nobel Prize for Chemistry together with Frédéric JOLIOT.

PETRUS DEBYE

Petrus Josephus Wilhelmus DEBYE was born at Maastricht, Holland, on March 24th, 1884. Having attended primary and secondary schools in his native town, he studied at the Technical College of the neighbouring German city of Aix-la-Chapelle, where he received his diploma as an electro-technical engineer in 1905. He first remained at the said college as an assistant in technical mechanics, and later went as an assistant in theoretic physics to Munich University, where he was admitted as a lecturer in 1910. The following year saw him professor-extraordinary of theoretic physics at the university of Zurich, but soon after (1912) he returned to his own country, being appointed professor of theoretic physics at Utrecht University. Again, two years later, he removed in a like capacity to Göttingen, where he was entrusted with the theoretic section of the physical institute. Subsequently he took charge of the entire institute and lectured on experimental physics.

In 1920 DEBYE once more went to Zurich, this time as professor of physics and head of the physical institute at the Confederate Polytechnic. In 1927 he transferred his activity to Leipsic in the same capacity. Since October 1935 he has been director of the „Kaiser-Wilhelm-Institut für Physik“ in Berlin-Dahlem and professor of physics at Berlin University.

WALTER NORMAN HAWORTH

Walter Norman HAWORTH was born at White Coppice, near Chorley, Lancashire, on March 19th, 1883. A pupil of W. H. PERKIN'S and H. B. DIXON'S, he graduated D. Sc., and then went to Göttingen, where he studied under TAMMAN and WALLACH, and was promoted D. Ph. in 1910. Since 1920 he has been a professor at the University of Birmingham. He is a member of the Royal Society, which conferred the Davy Medal on him in 1928; in 1933 he was awarded the Longstaff Medal. In 1936 he became a corresponding member of the Munich Academy of Sciences.

In the last two decades HAWORTH has most substantially promoted the chemistry of sugar. By the discovery of a brilliant method of dismemberment he has clearly proved that the ordinary simple sugars have no five-membered hetero-cycles but a pyranous structure, which is of great significance for the chemistry of the glucosides. He has also succeeded in producing isomeric sugars with furane rings, and in classing them among the less constant combinations. In continuation of his fundamental work, HAWORTH explained the constitution of the most important bioses, to mention only cane-sugar, malt-sugar, milk-sugar, and the cello-bioses. Some of these results proved of the greatest importance for the study of highly polymeric natural substances, such as cellulose, starch, and inulin. Finally, he took a prominent part in the chemical investigation of the vitamin C (ascorbine acid), and produced a synthesis of this interesting and biologically important combination.

These achievements prove HAWORTH to be a particularly successful investigator, whose name will permanently be linked with the chemistry of sugar.

PAUL KARRER

Paul KARRER was born of Swiss parents in Moscow on April 21st, 1889. The family, which originated from the Aargau canton, returned thither definitely in 1892, and settled at the village of Wildegg. Paul attended the elementary school in the neighbouring market-town of Möriken, the district school at Lenzburg, and a grammar school at Aarau. Matriculating in 1908, he went to Zurich University to study chemistry at the institute of Professor Alfred WERNER. Three years later, he graduated, with a dissertation dealing with nitrous-pentammine cobalt salts.

While acting for a year as WERNER'S assistant, KARRER started his first independent scientific work on the organic arsene combinations. This brought him into touch with Paul EHRLICH at Frankfort-on-Main, and led to his being employed as the latter's assistant at the "Georg Speyer Haus" at Frankfort, of which institute he subsequently was made a member. The six years he spent at Frankfort were of great importance for the further development of KARRER'S research work, since they acquainted him intimately with biochemical problems, a field of study to which he remained faithful. This period was productive of numerous treatises on organic arsene-combinations: *inter alia*, he dealt with the salvarsan salts of the metal complex, of which group silver-salvarsan is employed in therapeutics.

Appointed professor-extraordinary of organic chemistry at Zurich University in 1918, KARRER in the following year succeeded Alfred WERNER in the chair of chemistry and the management of the chemical institute.

The first greater field of investigation with which he had to deal was that of sugars and polysaccharides (starch, glycogene, insulin, cellulose, lichenin, chitin). In this connection he discovered the enzymatic divisibility of chitin, lichenin, and cellulose. By a special process, it was found possible to aminise cellulose and to produce amine thread, permitting of new insight into the nature of dyeing processes. The investigations regarding polysaccharides have been summed up in a monograph, "Polymere Kohlenhydrate" (1925).

Parallel with this work, KARRER treated glucosides, ricin and abrin, tanning materials, and lecithin, in which connection he discovered the non-homogeneity of tanning materials from tannin, and arrived at the first crystallised tanning materials; he also proved that natural lecithins consist of α and β lecithins. Numerous treatises were devoted to the configuration of albumen-amine acids and allied combinations. He was able to demonstrate that all albumen-amine acids belong to the same steric series and that the simple alkaloids examined (nictine, stachydrine, etc.) show the identical configuration.

In 1926 KARRER started his investigation of vegetable dye-stuffs, in the first place dealing with anthocyanes, which he recognised to be compounds. New anthocyanes were discovered, and the constitution of others thoroughly established. These studies led him to that of the carotinoids, then a poorly investigated field.

By dismemberment reactions and syntheses of perhydro derivatives, the constitution of the α and β carotins, lycopin, xanthophyl, zeaxanthine, astacine, crocetine, bixine, and squalens, were explained, while various new carotinoids were discovered, such as zeaxanthine, antheraxanthine, and carotinoids from purple bacteria (such as rhodoviolascine). When STEENBOCK and von EULER had established the effect of vitamin A effect of carotin, KARRER turned to the investigation of vitamin A itself, isolated it, explained its constitution, and established its constitutional relations to carotin.

His vitamin researches were thereupon enlarged by the investigation of vitamin C (ascorbin acid), and also of lactoflavin (vitamin B_2). KARRER managed to explain the structure and configuration of lactoflavin by dismemberment and by the synthesis of combination, and to augment the flavin group by numerous syntheses of similar combinations.

Yet another group of researches dealt with the hydrogen-transferring group of codehydrases (cozymasis and codehydrasis). KARRER showed that hydrogen-transference is effected by the nicotin-acid amide, present in the two codehydrases, which is able to absorb two hydrogen atoms, thereby forming an ortho-dihydro combination. This gave insight into the mechanism of the dehydration processes entailed by the codehydrases.

KARRER is the author of a textbook of organic chemistry (1927, 5th ed., 1937).

Of late years he has been awarded various scientific distinctions. He is honorary doctor of medicine of Breslau, Lausanne, and Bâle universities, and honorary doctor of the universities of Madrid and Lyons, bearer of the Marcel Benoit prize (Switzerland) and the Cannizzaro prize (Accademia dei Lincei, Rome), also honorary member of various Swiss and foreign scientific societies and academies.

III.

BEARERS OF THE PRIZE FOR PHYSIOLOGY AND MEDICINE

NOBEL PRIZE for 1901

EMIL VON BEHRING

Emil von BEHRING was born on May 15th, 1854, at Hansdorf near Deutsch-Eylau, East Prussia. He studied at the „Militärärztliche Bildungsanstalt“ in Berlin, where he graduated M. D. in 1878. After working for several years as an army surgeon at Poznan, he was promoted staff surgeon and transferred to Bonn (1887), and one year later in the same capacity to Berlin. Here he became assistant at the Hygienic Institute in 1889 and at the Institute for Infectious Diseases in 1891. In 1893 he was accorded the title of professor, being appointed professor of hygiene at Halle in the following year; transferred in a like capacity to Marburg in 1895, he was placed at the head of the Hygienic Institute in that university.

To BEHRING humanity owes important achievements in protection against infectious diseases, chief among them being his explanation of the diphtheria serum, the immunisation of cattle against tuberculosis, and an improvement of the milk diet of infants. What we know at the present time in regard to the occurrence of contagious diseases and to immunity may largely be attributed to BEHRING'S investigations and his "ætiological or blood-serum therapeutics", which he established as early as 1890.

BEHRING'S „Gesammelte Abhandlungen zur ätiologischen Therapie von ansteckenden Krankheiten“ were published in 1893, and a second series thereof in 1915. Other important writings from his pen were „Die Blutserumtherapie“ (1892), „Die Geschichte der Diphtherie“ (1893), „Die Bekämpfung der Infektionskrankheiten“ (1894), „Allgemeine Therapie der Infektionskrankheiten“ (1898), „Die Tuberkulosebekämpfung“ (1903), „Ätiologie und ätiologische Therapie des Tetanus“ (1904), and „Einführung in die Lehre von der Bekämpfung der Infektionskrankheiten“ (1912).

BEHRING was likewise editor of the „Beiträge zur experimentellen Therapie“.

In recognition of his investigations and discoveries BEHRING was accorded various distinctions, including prizes on the part of the Paris "Académie de médecine" and the "Institut de France;" in 1901, the year in which the Nobel Prize was conferred on him, he also received letters of nobility at the hands of the German Emperor.

The award of the first Nobel Prize for Medicine was "for his work on serum therapeutics, with special reference to their application against diphtheria, thanks to which pioneer research in medical science physicians have been furnished with a highly beneficial weapon in their fight against disease and death".

Von BEHRING died at Marburg on March 31st, 1917.

SIR RONALD ROSS

Sir Ronald ROSS, son of the British general Sir C. C. G. ROSS, was born at Almora, India, on May 13th, 1857. After completing his medical studies at St. Bartholomew's Hospital, London, he accepted a position in the Indian Medical Service, in which he remained until 1899.

Tropical diseases were at that time claiming their toll, and in 1892 ROSS commenced a long series of investigations on malaria. It was already known that the cause of the disease was the presence of parasites in the red blood corpuscles, but the part played by the mosquito in the transmission of the disease was yet unexplained. As the result of several years' research, ROSS finally discovered the pairing of parasites in the stomach of the mosquito; he thereupon traced the development of the disease in all its details, the spread of the germs to the insect's salivary gland and thence, through the sting, into human blood, the non-sexual phase of generation in the blood-corpuscles, with characteristic forms of development for each type of disease, the return of the germs to the bloodsucking insects, and the second phase of fertilisation in the latter.

In the year 1899 the Liverpool School of Tropical Medicine, at that time conducted by Sir Alfred JONES, commissioned ROSS to visit West Africa, where he found the species of mosquito responsible for the transmission of African fever. In 1902 ROSS was invited to fill the Jones Chair of Tropical Medicine at University College, Liverpool. As from 1923 he was director of the Royal Institute and Hospital for Tropical Diseases in London.

His principal publications were "Instruction for the Prevention of Malaria Fever" (1900), "Report of the Malaria Expedition" (1900), "First Progress Report of the Campaign against Mosquitoes in Sierra Leone" (1901), "Mosquito Brigades and how to Organize them" (1902), and "The Prevention of Malaria" (1910).

ROSS was member of the Royal College of Surgeons and of the Royal Society. He was knighted in 1911.

The Nobel Prize was awarded him "for his work on malaria, whereby he has discovered the manner in which the germs of this disease penetrate into the organism, and by which he has laid the foundation for valuable research in regard to this disease and its prevention".

Sir Ronald ROSS died on September 16th, 1932.

NIELS RYBERG FINSEN

Niels FINSEN was born at Thorshavn on the Faröer Islands on December 15th, 1860. He studied medicine at Copenhagen University, where he was appointed "prosector in anatomy" in 1890. This post he held till 1893, when he resolved to devote himself entirely to scientific research.

FINSEN undertook to investigate the biological rôle played by light in the life and health of mankind. He succeeded in establishing the influence of light on pox and subsequently on lupus, and thus became the founder of modern light-therapeutics.

When his first attempts to treat lupus by means of light had made the excellence of his new method manifest, he founded the light-therapeutic institute that bears his name ("Finsens Medicinske Lysinstitut") in 1896; by means of a substantial endowment on the part of the Danish Government and of subscriptions by foreign philanthropists, this institute was enabled to serve the important purpose of combating the disease known as lupus.

In 1901 FINSEN'S brilliant and philanthropic efforts were crowned by the inception, at Copenhagen, of a sanatorium for diseases of the heart and the liver.

When, in 1903, FINSEN received the Nobel Prize for Medicine, he immediately allotted 50,000 kroner to his institute and 60,000 to his sanatorium. The prize had been awarded him "in recognition of his treatment of diseases, with special reference to lupus vulgaris, by means of concentrated light-rays, whereby he has opened up new channels for the art of medicine".

Of his greater publications, "On the Use of Concentrated Light-Rays in the Art of Healing" (1896), "Photo-Therapeutics" (1899), and "On the Significance of the Chemical Rays of Light for Medicine and Biology" (1899) deserve special mention. An important series of scientific articles from his pen appeared in the periodical reports issued by his institute ("Meddelelser fra Finsens Medicinske Lysinstitut").

FINSEN, who was accorded the title of professor in 1899, was honorary member of numerous academies and scientific societies.

He died at Copenhagen on September 24th, 1904, at the early age of forty-four, not a twelvemonth after the award of the Nobel Prize.

NOBEL PRIZE for 1905

IVAN PETROVITCH PAVLOV

Ivan PAVLOV was born at Rjasan in Russia on September 14th, 1849. He studied medicine at St. Petersburg, where he took his M. D. degree in 1883, in the following year becoming lecturer in physiology at the Military-Medical Academy in the Russian capital. Appointed professor extraordinary in pharmacology at Tomsk, Siberia, in 1890, he was permitted to remain, in the same rank and capacity, at the Military-Medical Academy, and in the following year was also appointed director of the physiological section of the newly-erected Institute for Experimental Medicine, St. Petersburg. In 1895 he exchanged his chair of pharmacology for the chair of physiology, and in 1897 became professor of physiology at the same academy.

PAVLOV'S earliest research dealt with the physiology of the heart and of blood-circulation, with special reference to the innervation of the blood-vessels. Some brilliant results attended his subsequent investigations on the physiology of digestion, in which respect he paid chief attention to the eliminating activity of the glands, the secretion of gastric juices, and digestion itself, and was thus led to his later research regarding "conditional reflexes".

PAVLOV'S methods attracted a great number of pupils, many of whom became his collaborators and assisted him in carrying out his experimental investigations on an unusually large scale.

The scientific results he attained were, however, for a long time practically unknown to scientists outside Russia, seeing that he had published them exclusively in Russian. It was only when, in 1899, his book an "The Activity of the Digestive Glands" was translated into German that his reputation as a physiologist became international.

In regard to his other writings, we may mention "Experiments as Up-to-date, Uniform Methods of Medical Research" (1900), "The Supreme Nerve-Activity of Animals" (published in German in 1926), and "Conditional Reflexes" (translated into English in 1927). To the "Results of Physiology", a collective work compiled by several scientists, he contributed a consecutive survey of the fruits of his research work.

The Nobel Prize was awarded PAVLOV "in recognition of his work on the physiology of digestion, by which he has essentially reformed and extended scientific knowledge in this field".

PAVLOV died on February 27th, 1936.

ROBERT KOCH

Robert KOCH was born on December 11th, 1843, at Clausthal in the then Kingdom of Hanover. Though destined by his father for a commercial career, he soon evinced a keen preference for the natural sciences and turned to the study of medicine, matriculating at Göttingen University in 1862. Three years later, he was already assistant at the Pathological Museum, and soon after attained an academic prize; in 1866 he took his degree, passed the medical state-examination, and was appointed assistant at the general hospital of Hamburg. Thereafter he was for a time physician at the Langenhagen lunatic asylum, and finally set up as a medical practitioner at Niemegk, Brandenburg, whence he later removed to Rakwitz in what was then the Prussian province of Posen. Having done voluntary service, in a medical capacity, in the Franco-Prussian war, he passed his „Physikatsprüfung“ and became district physician at Wollstein, Posen.

Here it was that KOCH commenced research in a field in which he was to attain such outstanding fame, the field of the ætiology of infectious diseases; with the modest means at his disposal in so mediocre a position, he started investigations, first of all in regard to anthrax, in which connection he arrived at the surprising result that the rodshaped, microscopic formations in the blood of anthrax-patients were not crystals, as had been assumed, but organisms, anthrax bacilli. In his short treatise „Über die Ätiologie der Wundinfektionskrankheiten“, he was similarly able to establish (1878) that each of these maladies was due to a definite species of bacteria, occurring in definite quantities and in a definite distribution, so that the nature and course of the illness could be fully explained.

In 1880 KOCH obtained employment at the „Kaiserliches Gesundheitsamt“ in Berlin, where he was able to develop his bacteriological research by means of cultures, vaccination tests, dyeing methods, and microphotography, and to find an accurate method for the pure culture of bacteria, being the first to employ solid feeding bases in this connection. In this way he succeeded in establishing the bacterial cause of a whole series of contagious diseases. Thus, in 1882, he discovered the bacterium causing tuberculosis, a result that was little short of sensational. In 1884, when he visited Egypt and India at the head of the German cholera commission, he discovered the so-called comma-bacillus that causes Asiatic cholera. This achievement silenced any dissentient opinions that still existed, and his highly significant discoveries found unreserved recognition.

In 1885 he was appointed professor of hygiene at Berlin University, but relinquished his professorship in 1891 in favour of the directorship of the new „Institut für Infektionskrankheiten" specially founded for him in Berlin. In this position he remained until 1905.

KOCH likewise revised the rules governing disinfection, and set himself the task of combating disease on the basis of his conclusions; in this respect he had signal success in regard to tuberculosis by his creation of "tuberculin", a remedy which, though at first overrated, proved at any rate highly efficacious. Cholera, of which Germany suffered repeated epidemics in the nineties, he was able to combat just as effectively as he subsequently managed to overcome a typhus epidemic.

Particular attention, moreover, was paid by KOCH to tropical diseases: in South Africa in 1896 he discovered a means of combating rinderpest, besides which he studied recurrent African fever, malaria, and bubonic plague and found means for their medical treatment. By 1903 his fame had so greatly spread as to cause the British Government to summon him to Africa, where he successfully treated the coast fever affecting cattle and also what is known as "Texas fever". In 1906 he was once more in Africa, where in the neighbourhood of Lake Victoria he fathomed the nature of the sleeping-sickness, for which he also discovered a serviceable method of treatment.

Robert KOCH'S importance lies above all in the fact that he founded scientific bacteriology and, by his method of bacterial culture, furnished reliable proofs of the irritants of disease; by his discovery of remedies for combating irritants KOCH proved one of the greatest benefactors of mankind. In his address at the conferment of the Nobel Prize on KOCH on December 10th, 1905, Professor Count MÖRNER, Rector of the Carolinian Medico-Surgical Institute entrusted with the distribution of the Prize, summed up the motives that had led to this particular distinction in the following words: "Seldom has an investigator been able with such perspicacity to envisage in advance an uncharted region of research, and seldom has one been so brilliant and successful in the development thereof as has Robert KOCH. Seldom, moreover, have so many discoveries, of incisive importance for the human race, emanated from the activity of a single individual as has been the case with him."

KOCH, honoured by numerous appointments and distinctions, died on May 27th, 1910. His ashes were placed in the „Robert Koch Mausoleum" of the Berlin „Institut für Infektionskrankheiten Robert Koch". A marble relievo surmounts the urn, while on the opposite wall the names and dates of his principal works have been engraved in marble.

CAMILLO GOLGI

Camillo GOLGI was born at Corteno near Brescia, Lombardy, on July 9th, 1843. He studied medicine at the university of Pavia, where in 1875 he was appointed professor extraordinary in anatomy and histology; a few months later, however, he accepted a professorship at Siena, though only to return to Pavia in the following year; here, as from 1881, he was professor of pathological anatomy and director of the "histological and general pathological cabinet".

GOLGI did meritorious work in histology and anatomy. As early as 1870 he conceived a method (subsequently named after him) of colouring nervesubstance by treatment with nitrate of silver; by this means he was able exactly to observe the separate parts of the nerve tissue, and to make valuable investigations on the structure of the central nerve system. His observations in this regard were published as "Studii sulla fina anatomia degle organi centrali del sistema nervoso" (1883). Further investigations in this directions resulted in other publications, "Intorno alla struttura delle cellule nervose" (1898), "Sulla struttura delle cellule nervose dei gangli spinali" (1898/99), and "Sulla struttura delle cellule nervose del midollo spinale" (1902).

Apart from these investigations, GOLGI made important discoveries in regard to the parasitic irritants of malaria, results recorded in his treatise "Sull' infezione malarica" (1886).

The year 1903 saw the publication in three volumes of his "Opera omnia".

GOLGI was created a member of the Italian Senate and of numerous academies and other learned societies. The Nobel Prize was conferred simultaneously on him an on Santiago RAMON Y CAJAL "in recognition of their work on the structure of the nervous system".

The Nobel Lecture delivered in French by GOLGI at Stockholm in this connection was entitled "La doctrine du neurone, théorie et faits".

GOLGI died at Pavia on January 21st, 1926.

SANTIAGO RAMON Y CAJAL

Santiago RAMON Y CAJAL was born on May 1st, 1852, at Petilla de Aragon, Pamplona, Spain. Having studied medicine at Saragossa, he served for a year (1874/75) as an army surgeon, in which capacity he accompanied an expedition to Cuba. Appointed assistant in the Saragossa medical faculty in 1875, he was promoted professor extraordinary two years later, and made director of the medical museum of Saragossa University in 1879; in 1883 he removed to Valencia as professor of anatomy, and in 1887 to Barcelona as professor of histology and pathological anatomy. From 1892 he was professor at Madrid University until his retirement in 1922, having in 1902 also been appointed director of the "Investigaciones biológicas" and of the "Instituto nacional de Higiene".

RAMON Y CAJAL worked in various fields of general pathology, publishing his results and observations in numerous smaller treatises in French and Spanish scientific periodicals; his main region of research was the structure of the nervous system with special reference to the brain. In this connection we may refer to his greater publications, the "Manual de Histología normal y técnica micrográfica" (1889), which subsequently (since 1897) appeared in numerous editions as "Elementos de histología normal y técnica micrográfica"; as also his "Manual de Anatomia patholÓgica general", first printed in 1890 and repeatedly reprinted since then.

His studies on the cerebral cortex of human beings have also been translated into foreign languages. As from 1888 it was mainly in the "Rivista trimestral de Histología normal y patológica" and later in the "Trabajos del Laboratorio de Investigaciones biológicas de la Universitad de Madrid" that the results attained by RAMON and his pupils found publication.

Besides the Nobel Prize, awarded him jointly with Camillo GOLGI "in recognition of their work on the structure of the nervous system", RAMON gained various other prizes, and the Helmholtz Medal of the Berlin Academy. Numerous academies and societies elected him honorary member. He was also honorary doctor of the universities of

Cambridge, Würzburg, and Worcester. He lectured, by invitation, both in London and at the Clark University of Worcester.

RAMON Y CAJAL died on October 17th, 1934.

CHARLES LOUIS LAVERAN

Charles Louis Alphonse LAVERAN, son of an army doctor, was born in Paris on June 18th, 1845. In his boyhood he lived in Algiers, whither his father had been transferred, but returned to France for his university studies, attending first the Sorbonne and later the university of Strassbourg, at that time still a French city. Having seen active service as an army physician in the Franco-Prussian war, he was released from his military capacity after the capitulation of Metz, and worked at the hospital of Lille and later at the Hôpital de Saint Martin in Paris.

In 1874 he was appointed professor at the "École du Val-de-Grace", at which his father had been professor and finally director. From 1878 to 1883 he was once more in Algeria for the purpose of studying malaria, the irritant of which disease he succeeded in discovering, though its classification was not established until a later date. In 1882 he had occasion to confirm his inferences in an epidemic of malaria in the Roman Campagna.

In 1884 LAVERAN resumed his chair at the École du Val-de-Grace; ten years later he became chief medical officer at the Lille military hospital, but was soon after appointed to conduct the "office of public health" at Nantes. Neither instructional nor administrative work, however, suited his disposition, his interest centring in the scientific investigation of disease and in practical work in the sick-wards. He therefore joined the "Institut Pasteur", where he was entrusted with a department. Primarily attracted by the problems of malarial research, he visited all malarially infested regions of France, the Vendée, the island of Camargue in the Rhône delta, and Corsica. From 1900 onwards he successfully investigated the trypanosome diseases of cattle and other beasts in various places, and on several expeditions to the colonies. The African sleeping-sickness was likewise the object of his intensive study.

LAVERAN'S main publications were his "Nature parasitaire des accidents de l'impaludisme" (1881), "Traité des fièvres palustres" (1884), "Du paludisme et de son hématozoaire" (1891), "Traité du paludisme" (1897; 2nd edition, 1907), "Prophylaxie du paludisme" (in LEUATE'S encyclopædia, 1905), and, jointly with MESNIL, "Trypanosomes et Trypanosomiases" (1904).

LAVERAN was awarded the Bréant Prize of the "Académie des sciences" in 1889; he was elected member of the "Académie de médecine" and of the "Académie des sciences", and was made officer of the Legion of Honour.

The Nobel Prize was conferred on him "in recognition of his work on the significance of the protozoa as irritants of disease".

LAVERAN died in Paris on May 28th, 1922.

PAUL EHRLICH

Paul EHRLICH was born at Strehlen, Prussian Silesia, on March 14th, 1854, and studied medicine at the universities of Breslau, Strassbourg, Freiburg, and Leipsic. Having worked as assistant to Professor FRERICHS at Leyden, and later in the clinic of Professor GERHARD in Berlin, he attained a professorship in Berlin in 1881, and in 1896 was made director of the „Institut für Serumforschung und Serumprüfung“ at Berlin-Steglitz, which had been founded as a result of his fundamental researches, and which, enlarged to form the „Institut für experimentelle Therapie“, was removed to Frankfort-on-Main in 1899.

EHRLICH may be considered the first exponent of modern pathological biology. His scientific work consisted in the first place of colour-analytic studies in the histology of blood, studies to which hæmatology owes its solid foundations; subsequently, he turned his attention especially to studying the possibilities of immunity. Starting from the relationships which physiological chemistry had been able to establish between the tissues and materials introduced into the body, he succeeded in immunising the human body against certain vegetable poisons and in explaining the process of immunisation. By the principle of the quantitative increase of immunity, he achieved the preparation of very valuable remedial sera, and conceived a reliable method of measuring seral values and doses, with special reference to the serum of diphtheria. Together with BEHRING, he thus became the founder of the modern seral treatment.

In the course of his investigations on the constitution of the diphtheria toxin and in explanation of the effective processes of these remedial sera, he established his so-called “lateral-chain theory”, according to which the poisonous substances are absorbed in the cells of the tissue, and there intercepted and rendered unpoisonous by the serum. The main results of this research were set forth in EHRLICH'S „Gesammelte Werke zur Immunitätsforschung“.

On the fact that chemical materials may also have access to the tissue cells in the same way as the toxins and sera EHRLICH based his experimental chemo-therapy, for the practical study of which the „Georg-Speyer-Haus“ had been expressly adapted to his use.

His investigations on the arsenic-effect on atoxyls finally led him to the preparation of "salvarsan", a remedy first known as "Ehrlich-Hata 606", by means of which it is possible to destroy the irritant of syphilis without damage to the organism in general.

EHRLICH, who repeatedly had occasion to expound his studies and discoveries to a broader public by lectures in Germany, England, and America, was the recipient of manifold distinctions. Honorary doctor of the universities of Chicago and Oxford and honorary member of many scientifics bodies and academies, he was awarded the „Große goldene Medaille für Wissenschaft“ in 1903 and the Nobel Prize for Physiology and Medicine in 1908, the latter being conferred on him (and at the same time on METCHNIKOV) in recognition of their work on immunity.

EHRLICH died at Homburg-vor-der-Höhe on August 19th, 1915.

ELIE METCHNIKOV

Elie METCHNIKOV was born on May 16th, 1845, in the government of Charkov, Russia, on the estate of his father, an officer in the Imperial Guard. At the university of Charkov he studied natural sciences, and then repaired to Germany, where he supplemented his knowledge of zoology at Giessen, Göttingen, and Munich. Returning to Russia, he became lecturer in zoology at the newly-founded university at Odessa, whence he went in the following year in the same capacity to St. Petersburg. From 1870 to 1882 he was again at Odessa, as professor of zoology and comparative anatomy, but elected to retire into private life in the latter year in consequence of the disturbances caused by the reaction after the murder of Tsar Alexander II.

METCHNIKOV went to Messina to continue his studies on comparative embryology. Here it was that he made the discovery of the occurrence of phagocytosis in inferior animals, which led him to the study of contagious diseases and of those processes by which the animal organism seeks to combat the penetration of microbes. For several years he worked merely in his private laboratory, but its limited equipment finally caused him to return to Odessa in 1886 to conduct the bacteriological station just established there.

The contradictions ecountered by his theory of phagocytes induced him to resume his investigations, this time on a broader basis. To this end he went to Paris to seek the aid of PASTEUR, who immediately equipped an experimental laboratory for him and appointed him its director. In 1904 he became deputy-director of the PASTEUR Institute itself.

METCHNIKOV'S earlier work dealt with the development and comparative anatomy of the invertebrates, as also with general pathology. Besides this, however, he was also occupied with anthropological problems, publishing anthropological studies on the Kalmucks from 1874 to 1876.

By way of his „Untersuchungen über die intrazelluläre Verdauung bei wirbellosen Tieren“ (published among the works of the zoological institute of Vienna University in 1883), he was first led to observe the cells which he subsequently named "phagocytes" in view of their consumptive activity, and to examine their efficacy in particular for the destruction of solid substances whose intrusion gave rise to diseases. He came to the conclusion that the so-called "inflammations" are nothing but a struggle between the phagocytes and these intruders. In 1884 he published his theory according to which the white blood corpuscles have the property of combating noxious bacteria that invade the body.

Thus METCHNIKOV passed from his original field of zoology to that new medical field in which he was destined to achieve such important discoveries. In connection with phagocytes, he next studied the problem of immunity from the angle of a possible destructive, inter-cellular activity on the part of the phagocytes in all infectious diseases. His first opinion, expressed quite exclusively in favour of the phagocytes in regard to the processes of immunisation, he was admittedly obliged to modify in the course of further contradictory investigations, but he was still able to maintain it in its essential points in 1901 in his monograph "De l'immunité", and to give it a new and precise formulation in 1913 in an article entitled „Die Lehre von den Phagozyten und deren experimentellen Grundlagen", which he contributed to the „Handbuch der pathogenen Mikroorganismen", compiled by KOLLE and WASSERMANN.

Apart from the pathology of inflammations, he was particularly interested in the pleomorphism of bacteria, in the problem of preventive vaccination against contagious diseases, with special reference to the investigation of the bacteriocidal properties of rat's blood, and in the toxins and anti-toxins of cholera.

Special reference may be made to his "Immunité dans les maladies infectieuses" (1901), "Études sur la nature humaine" (1903), and "Leçons sur la pathologie comparative de l'inflammation". METCHNIKOV was co-editor of the "Annales" issued by the PASTEUR Institute.

Manifold distinctions were accorded METCHNIKOV for his extensive scientific achievements, among them the Copley Medal of the London Institute of Public Health and the Wilde Medal of Manchester, the honorary doctorship of Cambridge University, and the membership of numerous academies and other learned societies.

He was likewise president of the "École Russe des hautes études sociales".

As in the case of EHRLICH, with whom it was shared, the Nobel Prize was awarded him for his "work in regard to immunity".

METCHNIKOV died in Paris on August 15th, 1916.

THEODOR KOCHER

Emil Theodor KOCHER was born at Berne on August 25th, 1841. After being awarded honours throughout his school and university curriculum, he finally took his M. D. degree in 1865. In the following year he was lecturer, and from 1872 professor of surgery at Berne (in succession to Professor LÜCKE), and director of the surgical clinic in the university. In this dual position he remained until his retirement in 1911, not without declining various flattering invitations to other seats of learning.

KOCHER'S research work in his pre-professorial days dealt with styptic processes and the setting of shoulder-dislocations; the work of the chief period of his activity was mainly in the field of the antiseptic treatment of wounds, then a new science, which attracted young physicians from far and wide to his surgical clinic at Berne to receive training at his hands. His „Vorlesungen über chirurgische Infektionskrankheiten", compiled in collaboration with TAVEL, first appeared at Berne in 1892, being reprinted at Jena in 1909.

The courses he was called upon to conduct for army surgeons were productive of various treatises on the explosive effect of shells, and on wounds caused by cartridges.

KOCHER did justice to the fame he enjoyed as one of the most renowned surgeons of his day by the comprehensive range of his scientific activity; thus he initiated a new theory on the fracture of bones (known as the "extension theory"), demonstrated the surgical treatment of gall-stones, expounded remedies for the affections of the male genitals, lectured on injuries of the spine (a valuable contribution to the physiology of the dorsal marrow), on traumatic epilepsy, injuries and concussions of the brain, and the operation of muscles affected with cramp, and was particularly renowned for his work in regard to goitre and the illnesses of the lymphatic gland.

It was, indeed, "for his work on the physiology, pathology, and surgery of the lymphatic gland" that he was awarded the Nobel Prize.

KOCHER, who, in receipt of numerous honours and distinctions, had been appointed chairman of the „Deutsche Gesellschaft für Chir-

urgie" (Berlin) in 1902 and president of the First International Congress of Surgeons in 1905, died at Berne on July 27th, 1917.

ALBRECHT KOSSEL

Albrecht KOSSEL was born at Rostock, Mecklenburg, on September 16th, 1853, and studied medicine at the universities of Strassbourg and Rostock. Having graduated at Rostock in 1878, he immediately returned to Strassbourg to work as an assistant at the Physiologic-Chemical Institute, and at the same time to start lecturing, in a private capacity, on physiological chemistry and hygiene. In 1883 he was appointed head of the chemical section of the Berlin Physiological Institute, and in 1887 professor extraordinary at Berlin University. From 1895 to 1901 he occupied the chair of physiology and the position of director of the Physiological Institute in the university of Marburg, Hesse; subsequently he removed to Heidelberg, where he lectured until 1923.

In his academic activity KOSSEL dealt with the entire realm of physiology, but his particular field of research was physiological chemistry. In this direction he started with investigations on the component parts of the cellular nucleus, and later occupied himself with the alterations in albumin-bodies during transformation into peptone, with the effects of a phenetol diet on the urine, with the peptonic components of the cells, with the simplest albumin-bodies, and with many other problems of physiological chemistry.

From 1895 KOSSEL was for a long time editor of the „Zeitschrift für physiologische Chemie" founded by HOPPE-SEYLER and BAUMANN. Of his writings, most of which appeared in this periodical, those deserving special mention were the „Untersuchungen über die Nukleine und ihre Spaltungsprodukte" (1881), „Die Gewebe des menschlichen Körpers und ihre mikroskopische Untersuchung" (jointly with BEHRENS and SCHIEFFERDECKER, in two volumes, 1889—1891), and the „Leitfaden für medizinisch-chemische Kurse" (1888, since reprinted in several editions).

Furthermore, KOSSEL wrote „Die Probleme der Biochemie" (1908) and „Die Beziehungen der Chemie zur Physiologie" (the latter being a contribution to „Kultur der Gegenwart," 1913).

KOSSEL was honoray doctor of several universities and member of many scientific societies.

The Nobel Prize was awarded him "in recognition of what he had achieved in the sphere of cellular chemistry by his research on albumin-substances and nuclein-substances".

KOSSEL died at Heidelberg on July 5th, 1927.

ALLVAR GULLSTRAND

Allvar GULLSTRAND was born on June 5th, 1862, at Landscrona, Sweden, where his father, Dr. Peer Alfred GULLSTRAND, was district medical officer. Allvar studied medicine at Uppsala, Vienna, and Stockholm, and in 1890 took his doctor's degree at Stockholm with a dissertation which he called "Contribution to the Theory of Astigmatism". One year later he was already lecturing in ophthalmology, and 1894 was appointed by Uppsala University to the newly-established chair for this subject, which he was to fill for more than thirty years.

His "General Theory of Monochromatic Aberrations and its Immediate Results for Ophthalmology" (1900) gained him prizes from the Swedish Academic and the Swedish Medical Society; many other writings from his pen were likewise accorded prizes.

GULLSTRAND distinguished himself in particular in ophthalmometry and in the study of astigmatism.

Of his writings, "The Real Optical Image" (1906), "The Optical Image in Heterogeneous Media and the Dioptrics of the Human Crystal Lens" (1908), and "Introduction into the Methods of the Dioptrics of the Human Eye" (1911) deserve special mention.

GULLSTRAND was honoray doctor of the universities of Uppsala and Jena and member of many Swedish and foreign scientific societies.

The Nobel Prize was awarded him "for his work on the dioptrics of the eye".

GULLSTRAND died on July 28th, 1930.

ALEXIS CARREL

Alexis CARREL, the great authority on vascular sutures and the transplanting of organs, was born at Sainte-Foy, near Lyons, on June 28th, 1873. He studied medicine at Lyons University, where he graduated in 1900. While working as a practitioner at the main Lyons hospital, he was at the same time "prosector" at the clinic of Professor TESTUT, where he specialised in surgery, and started experimental work on his own account. In 1904 he emigrated to America and worked, as from 1905, in Professor STEWART'S physiological laboratory at Chicago University. One year later, however, he was invited to join the Rockefeller Institute for Medical Research in New York, where he developed an exceptionally fertile scientific activity, and did much valuable research work in regard to vascular seams and the transplantation of organs.

CARREL discovered the ability of living tissues of the body to continue their growth outside the body in adequate nutritive solutions, a process which he named "explantation", and succeeded experimentally in furnishing the proof that certain cells, e. g. living leucocytes, emit growth-substances, so-called "trephones", which influence cellular division and the growth of the tissue.

On this subject he published a report as early as 1902; the results of his later investigations (from 1905 to 1912) were set forth in various treatises in scientific periodicals.

The Nobel Prize was awarded him "in recognition of his work on vascular seams and on the transplantation of vessels and organs".

His Nobel Lecture, delivered in 1912, was on the "Suture of Bloodvessels and Transplantation of Organs".

CHARLES RICHET

Charles RICHET, son of Professor Alfred RICHET, a well-known surgeon, was born in Paris on August 26th, 1850. He studied medicine in Paris, where he graduated M. D. in 1877, and "docteur ès-sciences" one year later. From 1887 he was professor of physiology in Paris.

His early work dealt with the physiology of the brain and the nerves; he subsequently studied animal warmth and the exchange of gases in respiration. In experimental therapeutics he was able to demonstrate in 1888 that the blood of animals vaccinated against an infection will in its turn serve to counteract the same infectious malady. This observation he also applied to tuberculosis, and he was thus the first to test therapeutic injections on human beings. From 1895 he edited the "Dictionnaire de Physiologie", prior to which he had, however, already started editing the "Revue scientifique", which he conducted for a quarter of a century. From 1917 he also collaborated with GLEY and TEISSIER in editing the "Journal de Physiologie et de Pathologie générale".

To RICHET we owe in particular the discovery (made in 1902) of what he himself called "anaphylaxis", i. e. the increased sensibility of the body to alien albumen, in which connection pathological phenomena occur. A special scientific literature attached to RICHET'S anaphylaxis, which may, indeed, be said to play an important rôle in all pathology, the "anaphylactic test" having proved the most sensitive diagnostic accessory in establishing the presence of various albuminous substances, both animal and vegetable. It was in recognition of this work that RICHET was awarded the Nobel Prize.

Among his earlier physiological works, we may mention his "Leçons sur la chaleur animale" (1884) and his "Essai de psychologie générale" (1884).

RICHET also showed interest in the problems of spiritualism, besides which he was the author of some dramatic works.

He died on December 4th, 1935.

NOBEL PRIZE for 1914

ROBERT BÁRÁNY

Robert BARANY, of Hungarian origin, was born in Vienna on April 22nd, 1876, and studied medicine in his native town. After graduating, he practised at various German clinics, but subsequently became operator at Professor GUSSENBAUER'S clinic in Vienna, and thereafter demonstrator, and in 1905 assistant, at the auricular clinic of Vienna University, their conducted by Professor POLITZER; in 1909 he was admitted to the university as lecturer on auricular medicine.

In this field of science BÁRÁNY published numerous important treatises, most of them referring to the physiology and treatment of the so-called "vestibular apparatus" in the internal human ear, which serves as an organ for the sense of equilibrium. In his „Untersuchungen über den vom Vestibularapparat des Ohres reflektorisch ausgelösten rhythmischen Nystagmus und seine Begleiterscheinungen" (1906), he set forth his important discovery of the caloric reaction of the inner ear, and furnished the first demonstration of an exact examination of the functions performed by the vestibular apparatus. These investigations ultimately made it possible in medical practice to diagnose festerings in the labyrinth. In 1909 he succeeded in finding a new method of examining the relations to one another of the vestibular apparatus, the brain, and the spinal marrow, a method known as the "indication-test".

Numerous honours were accorded him in recognition of his work: thus, in 1912, he was awarded a moiety in the Politzer Prize, in 1913 a prize by the Belgian Academy of Sciences in Brussels, in the same year the so-called „Erb-Denkmünze", and in 1914 the Guyot Prize of Groningen University.

The Nobel Prize for Physiology and Medicine was awarded him "for his work on the physiology and pathology of the human vestibular apparatus".

From 1917 BÁRÁNY was Professor at Uppsala University and head of the clinic for affections of the ear, nose, and throat.

He died on April 8th, 1936.

JULES BORDET

Jules BORDET was born at Soignies, in Belgium, on June 13th, 1870. He studied medicine and graduated in 1892, with a dissertation on "Adaptation des virus aux organismes vaccinés". From 1894 to 1901 he worked in the Pasteur Institute in Paris, and in the latter year became director of the affiliated Pasteur Institute in Brussels, at the university of which city he has been professor since 1907.

BORDET is one of the most prominent Belgian bacteriologists, and has published a great number of treatises on bacteriology and serology, of which special importance attaches to the following: "Recherches sur la phagocytose" (1896), "Le mécanisme de l'agglutination" (1899), "Les propriétés des antisensibilisatrices et les théories chimiques de l'immunité" (1904), "Remarks on the Anti-complements" (1905), "On the Effects of Active Substances in the Blood-serum" (1910), "Les théories de l'hémolyse" (1912), "La coagulation du sang et la genèse de la thrombine" (1912), "Anaphylaxis, its Importance and Mechanism" (1913), "Historic Survey and General Opinions of Immunity" (1914), "History of the Hæmolysines" (1914), and "Traité de l'immunité" (1920).

One important achievement on the part of BORDET lies in his discovery of the reaction of complementary union; in collaboration with GENGOU, moreover, he discovered the bacillus of whooping-cough in 1906.

BORDET is member of many academies and learned societies and honorary doctor of Cambridge University; he was awarded the "Prix de la Ville" of Paris in 1911, and the Hansen Prize and the Pasteur Medal of the Swedish Medical Society two years later.

The Medical Nobel Prize was conferred on him "for his discoveries in the realm of immunity".

AUGUST KROGH

August KROGH was born at Grenaa, Jutland, on November 15th, 1874. He studied zoology at Copenhagen University, and soon began independent work at the Physiological Laboratory under Professor Christian BOHR. There he became "preparator" in 1899. Having undertaken a zoological expedition to Disko in Greenland in 1902, he took his doctor's degree in the following year. In 1908 a special readership in zoophysiology was created for him at the university; while the laboratory requisite for this purpose was being erected, he undertook a second expedition to Greenland, this time accompanied by his wife, Marie KROGH, née JÖRENSEN, herself a physician, the main attention of the two investigators being devoted to alimentation conditions among the Esquimaux, and to the effect of an exclusive meat diet on the organism. By 1910 his Copenhagen laboratory was completed, and thenceforth KROGH engaged, partly by himself and partly in collaboration with his wife and with Professor LINDHARD, in studies regarding the physiology of breathing and blood-circulation. These investigations subsequently led him to an exact measurement of the blood-circulation in the human body.

In the year 1916 he was accorded a chair zoophysiology at Copenhagen University, which he still occupies.

In 1906 KROGH was awarded the Seegen Prize offered by the Vienna Academy of Sciences for his conclusions regarding the rôle played by nitrogen in the metabolism of the animal body. The question, unsolved for decades, as to whether the nitrogen of the albuminates transformed in the bodies of animals is partly secreted in a gaseous form as pure nitrogen through the skin or lungs, was definitely answered by KROGH, in a negative sense, in his laureate treatise based on careful experimental investigations.

Since the establishment of his laboratory, KROGH has published the results of his researches in a series of "Collected Papers" running into several volumes. His work on metabolism in animals and human beings has entailed a great number of similar investigations on the part of Professor KROGH'S pupils, the results attained being published in Danish and English.

In 1920 KROGH was awarded the Nobel Prize "for his discovery of the capillary-motoric mechanism of regulation".

ARCHIBALD HILL

Archibald Vivian HILL was born at Bristol on September 26th, 1886. He studied at Cambridge, where he first devoted himself to mathematics. One of his teachers, Walter Morley FIETCHER, subsequently Secretary of the Medical Research Council but at that time engaged, together with F. G. HOPKINS, in investigating the lactic-acid transformation in the muscular system (a problem that subsequently led to fundamental studies on the part of those two scientists on the nature of muscular contractions), induced HILL to take up the study of physiology. Having supplemented his studies by several months in Germany, where he attended the lectures of BÜRKER and PASCHEN, HILL commenced his independent research work in 1914 with investigations of the physiology of muscular contractions.

In the same year he accepted a post as lecturer on physical chemistry at Cambridge University, but during the World War he naturally saw his work interrupted. In 1919, however, he resumed his researches on the physiology of muscular activity, contacting intimately in this connection with Professor MEYERHOF, of Kiel, whose investigations from a different angle led to quite analogous results. Thenceforth the two ex-enemy scientists were in constant collaboration. In 1919 W. HARTREE also participated in HILL'S myothermic investigations. In 1920 HILL was appointed to a chair of physiology at the University of Manchester, and three years later he obtained a professorship at London University, in succession to Professor E. H. STARLING.

HILL'S main field of research, meanwhile, continued to be his investigation of metabolism in muscular activity.

The Nobel Prize for Physiology was conferred simultaneously on him and MEYERHOF, the award in the case of HILL ensuing for his discoveries in regard to muscular metabolism. His Nobel Lecture, delivered in the following year, was on "The Mechanism of Muscular Contractions".

Professor HILL lives in London.

OTTO MEYERHOF

Otto MEYERHOF was born at Hannover city on April 12th, 1884. He studied medicine at Freiburg, Berlin, Strassbourg, and Heidelberg, graduating at the last-named university in 1909. After working for a time at the Zoological Station of Naples, he became lecturer in physiology at the university of Kiel and assistant at the Physiological Institute there; in 1914 he obtained a professorship at Kiel and retained it until 1924, when he was made a member of the „Kaiser-Wilhelm-Institut für Biologie“ at Berlin-Dahlem.

MEYERHOF started his scientific career with physiological research, which resulted in his „Beiträge zur psychologischen Theorie der Geistesstörungen“ and in a brochure on „Goethes Methoden der Naturforschung“.

One of his teachers, Otto WARBURG, professor of botany at Berlin University, awakened his interest in the physiological investigation of cells, a field in which he was destined to make some signal discoveries. In this direction he first worked on the mechanism of cellular oxydation, and later on studied the respiration of the muscular system, on the basis of the analogy existing between oxygen respiration and alcoholic fermentation; this led him to important novel results in regard to the metabolism of energy in the muscles. It was for his discovery of the legitimate proportion between the consumption of oxygen and the metabolism of lactic acid that, in 1922, concurrently with Archibald HILL, he was awarded the Nobel Prize.

His Nobel Lecture, delivered at Stockholm, was a concise outline of „Die Energieumwandlung im Muskel“; it later appeared in book-form. Prior to this, he had responded to invitations to lecture in England and America; these lectures appeared in a collected form as “The Chemical Dynamics of Living Matter”.

In regard to his other publications, we may mention his „Thermodynamik des Lebensprozesses“, compiled in 1926 for the „Handbuch der Physik“. MEYERHOF is honorary member of the Harvey Society. He lives in Berlin.

FREDERIC BANTING

Frederic Grant BANTING was born at Alliston, Ontario, on November 14th, 1891, and acquired his scientific training at the University of Toronto, where he took his M. D. degree in 1922. Prior to graduating, however, he had already worked as a physician at the sick children's hospital of Toronto (1919/20) and, in 1920, had started lecturing in physiology at the Western Ontario University at London, Ont., and thereafter, for one year, on pharmacology at Toronto University. Here, upon his graduation, he was promoted demonstrator, and in the following year he was appointed professor of medicine. At the same time he has for several years been medical adviser at the main hospital of Toronto, as also at the children's hospital, and the so-called Western Hospital.

Since 1921 BANTING has very successfully investigated the internal secretion of the prancreatic gland and, in particular, the nature and effect of "insulin", which is of such importance for the treatment of diabetes.

For this research work he was awarded the Gold Medal and the Reeve Prize of Toronto University in 1922. In 1925 the Canadian Parliament voted him an annuity for life, while in the same year his university established a permanent, amply-endowed chair for medical research, to be thenceforth known as the BANTING-BEST chair.

Jointly with MACLEOD, he was selected for the Nobel Prize in 1923, "for the discovery of insulin".

BANTING lives at Toronto.

JOHN MACLEOD

John James Richard MACLEOD was born at Cluny, Perthshire, Scotland, on September 6th, 1876. He first studied medicine at Aberdeen, and subsequently biochemistry at the physiological institute of the university of Leipsic. On his return to Great Britain, he worked for two years as demonstrator in physiology at the London Hospital Medical College, where, besides teaching, he was able to engage in extensive research work.

In 1903 MACLEOD was appointed Professor of Physiology at the University of Cleveland, Ohio, where well-equipped laboratories afforded him scope for successful experimental investigations. He remained at Cleveland until 1918, in which year he went to the University of Toronto; here he continued to lecture until his decease on March 19th, 1935.

MACLEOD was an eminent investigator, both as a physiologist and as a biochemist. His first endeavours dealt with the examination of the physiological effects of condensed air on the animal constitution; later he turned to the metabolism of carbon-hydrates, on which subject he published a series of treatises, as from 1906, under the title of "Experimental Glycosuria". He tock an important part, moreover, in the investigation of diabetes, and in 1913 published a monograph on "Diabetes, its Physiological Pathology", followed, in 1919, by "Fundamentals of Physiology". In the discovery and investigation of insulin and of its physiological effects MACLEOD likewise did fruitful work; together with numerous collaborators he published much that was valuable in this direction in the "American Journal of Physiology" and in the "Toronto University Studies". Among these treatises special importance attaches to his "Pancreatic Extract and Diabetes", and "The Source of Insulin", both of which appeared in 1922, and to his address on the occasion of the XIth International Congress of Physiologists in the following year.

MACLEOD also evinced keen interest in the methods of the medical training of clinical physicians, for which he compiled directives in his "Physiology and Biochemistry in Modern Medicine".

The numerous distinctions awarded him include the Cameron Prize of the university of Edinburgh, an honorary doctor's degree of the university of Toronto, and the membership of several scientific corporations. From 1921 to 1923 he was president of the American Physiological Society.

The Nobel Prize was conferred on him (and simultaneously on BANTING) "for the discovery of insulin".

WILLEM EINTHOVEN

Willem EINTHOVEN was born at Semarang, Java, on May 21st, 1860, his father being at that time a medical practitioner in the Dutch colonies. The son came to Europe to study medicine at Utrecht University, assisted Professor SNELLEN in his private practice, and graduated in 1885 with a thesis on "Stereoscopy by Means of Colour-Difference". In the very same year he was appointed professor of physiology at Leyden University, where he continued to lecture without interruption.

EINTHOVEN interested himself especially in the so-called actional currents of the heart, i. e. the electric currents developed independently by the heart and emitted thereby to the individual parts of the body. He discovered a method of graphically portraying these currents and the contraction of the heart by means thereof, and of investigating them with the aid of a string-galvanometer; by bringing this instrument into contact with the body at two points, e. g. the hands, he was able to make an electro-cardiogram, the heartbeats being recorded by corresponding deviations of the galvanometer, which may then be photographically registered.

EINTHOVEN, whose results were mainly set forth in scientific periodicals, also published serial "Investigations from the Leyden Physiological Laboratory".

The Nobel Prize was awarded him "for the discovery of the mechanism of the eletro-cardiogram". His Nobel Lecture dealt with "The String-galvanometer and the Measurement of the Actional Currents of the Heart".

EINTHOVEN died at Leyden on September 29th, 1927.

JOHANNES FIBIGER

ohannes Andreas Grib FIBIGER was born at Silkeborg, Denmark, on April 23rd, 1867. He studied medicine under KOCH and BEHRING, and in 1891, after practising in hospitals, was appointed assistant to Professor SALOMONSEN in the bacteriological laboratory of Copenhagen University. From 1894 to 1897 he practised at the Blegdamshospital (for infectious diseases), at the same time working on his graduation thesis, "Bacteriological Studies on Diphtheria", which in 1895 earned him his doctor's degree. Two years later he became prosector at the Institute for Pathological Anatomy and, in 1900, professor af pathological anatomy at Copenhagen University and head of the Anatomo-Pathological Institute.

FIBIGER'S international reputation rests on his cancer research, in which connection he succeeded, in 1913, in experimentally producing cancer-tumours in the stomachs of rats.

Prior to this, in 1907, he had detected a hitherto unknown tumour in the gastric cavity of mice, and at the same time an unknown parasite, a species of maggot, subsequently called spiroptera neoplastica. It was no easy matter to establish the connection between these parasites and the newly-discovered formations, and FIBIGER'S attempts to produce the phenomena of cancer in healthy mice by vaccination (for which purpose he tested more than 1000 mice) were at first doomed to fail completely. At a Copenhagen cane-sugar refinery, however, he discovered the tumorous phenomena he had been seeking to be fairly general in the rats abounding there. The works in question were also overrun with beetles, which fed on the excrements of the rats, thereby swallowing the eggs of the parasitic maggots and permitting them to develop into larvæ in their muscular systems. Since the beetles, in their turn, were devoured by the rats and mice, the maggots were able to complete their development in the bodies of the rodents.

FIBIGER now fed healthy rats with the larvæ-containing beetles, and thus in a great number of cases produced cancer-tumours. It had therefore become possible to transform organically sound cells experimentally into cancer-cells, and at the same time to prove that the maggots in question were the real irritants of cancer.

FIBIGER'S discovery was of the greatest importance, since the possibility of producing cancer arbitrarily furnished cancer research with an invaluable method, and also acted as a powerful incentive to further studies. FIBIGER'S discovery constituted a milestone on the path towards the explanation and prevention, or cure, of this ghastly disease.

FIBIGER was co-founder of the "Acta pathologica et microbiologica scandinavica", and co-editor of ZIEGLER'S "Contributions to Pathological Anatomy and General Pathology". He also held a great number of public offices, being, *inter alia*, chairman of the International Union for Cancer Research and member of many learned societies and academies.

He was awarded the Nobel Prize "for his discovery of the carcinoma of spiroptera".

He died at Copenhagen on January 30th, 1928.

NOBEL PRIZE for 1927

JULIUS WAGNER-JAUREGG

Julius WAGNER-JAUREGG was born at Wels, Upper Austria, on March 7th, 1857. He studied medicine in Vienna, where he took his degree in 1880. Having worked for a year as assistant in general and experimental pathology, he was for six years assistant at the Vienna Psychiatric Clinic. In 1889 he was appointed professor extraordinary and head of the clinic for psychiatry and nervous complaints in Graz (Austria), and in 1893 professor and head of the corresponding clinic in Vienna. This position, in which he acquired the reputation of a leading authority on psychiatric medicine, he retained for no less than 35 years, finally retiring in 1928.

WAGNER-JAUREGG'S first scientific work, compiled when he was still an undergraduate, was his dissertation, „Ursprung und Funktion der beschleunigten Herznerven“ (1878), followed by studies on „Die respiratorischen Leistungen des Nervus vagus“. His researches on the physiology and pathology of the thyroid gland led him to the study of cretinism and to its treatment by means of thyroid-gland extract. Another great achievement on the part of WAGNER-JAUREGG was the treatment of goitre by means of iodine; by the admixture in table-salt of a weak dilution of iodine he found a means of preventing the formation of goitre.

Other publications dealt with „Paralyse und Neuralgie“, with the „Künstliche Anästhesie der Haut“, with „Erscheinungen am Zentralnervensystem nach der Wiederbelebung Erhängter“, and with problems of forensic psychiatry and legislation affecting the insane.

All these important scientific achievements, meanwhile, were excelled by his brilliantly conceived and successfully realised treatment of progressive paralysis.

While still a young physician he had envisaged the possibility of curing insanity or psychosis by the injection of a febrile infectious disease. In the first place, he attempted to cure progressive paralysis by means of a tuberculin treatment; not satisfied with the results attained, he proceeded to produce artificial malarial fever by vaccinating the paralytic patients with malaria tertiana, and in this way actually succeeded in conquering progressive paralysis, that most serious of all mental afflictions, hitherto considered wholly incurable.

In recognition of this extraordinary work in the service of suffering humanity, the Nobel Prize was conferred on WAGNER-JAUREGG "for his discovery of the therapeutic importance of malaria vaccination in cases of dementia paralytica".

WAGNER-JAUREGG is honorary member of the Vienna Academy and of numerous other academies and societies.

CHARLES NICOLLE

Charles Jules Henri NICOLLE was born at Rouen, Normandy, on September 21st, 1866. He came of an old Norman family, and was the second son of Dr. Eugène NICOLLE who had made a name as a hospital physician and as professor at the Rouen Ecole de Médecine.

It was at this college that Charles NICOLLE absolved his medical studies; later, he practised in Paris, became "preparator" in pathological anatomy under the direction of GOMBAUT at the "Faculté de Médecine", and subsequently preparator in micro-biology at the "Institut Pasteur" under ROUX. His elder brother, Maurice NICOLLE, had likewise specialised in microbiology; after practising in Paris hospitals, he had been appointed director of the Bacteriological Institute at Constantinople; later on he was professor at the "Institut Pasteur" in Paris.

Charles NICOLLE graduated M. D. in 1893, his dissertation being entitled "Recherches sur le chancre mou", and in the same year he secured an appointment as professor extraordinary at his old college at Rouen, where he also practised in the hospital and acted, as from 1896, as conductor of the bacteriological laboratory, a post he retained for seven years. Here, *inter alia,* he initiated the preparation of the new anti-diphtheria serum. In 1903 he undertook the direction of the Pasteur Institute at Tunis, which had been founded shortly before; he completed its scientific organisation and improved its financial position, so that, under his administration, the institute experienced a great rise and extended its practical and scientific influence over all Africa, for not only were many thousands vaccinated there against hydrophobia, but great amounts of vaccine were furnished by the institute to physicians all over the continent. When, in 1928, NICOLLE celebrated his 25-years jubilee as director of the Tunis Pasteur Institute, he was handed a gold medal with an inscription which declared that "the scientific world admired his achievements and wished him many more years of happiness and successful endeavour".

NICOLLE was one of the most prominent exponents of bacteriology and sero-therapy. At his institute he prepared great quantities of preventive vaccines against typhus, and took a keen scientific interest in the epidemic diseases, typhus, leprosy, measles, scarlet fever, influenza, whooping-cough, etc., in mushroom poisoning, and in microbes in general; he also published treatises on the Egyptian eye-illness and many other matters. There was hardly an aspect in the pathology of North African diseases to which he did not devote his attention. Among his chief tasks was the prophylaxis of diphtheria and tuberculosis. He, furthermore, discovered the preventive force of the serum of typhus in measles convalescents. In all these lines of research he may be said to have conferred invaluable benefits upon his fellow-men.

NICOLLE was officer of the French Legion of Honour and honorary member of several academies and medical associations. In 1909, 1912, and 1914, he received the Montyon Prize of the "Académie des sciences," in 1927 the Osiris Prize conferred by the five classes of the "Institut de France", and in 1928 the Nobel Prize for Medicine, awarded him in particular "for his work in regard to typhus".

NICOLLE also made a name as a writer by his spirited, fanciful stories, "Le Pâtisseur de Bellone", "Les Feuilles de la Sagittaire", "La Narquoise", "Les Deux Larrons", "Les Menus plaisirs de l'ennui", and "Marmouse et ses hôtes". He also published a book of medical-philosophic contents, "Naissance, Vie et Mort des Maladies infectieuses".

NICOLLE died on February 28th, 1936.

CHRISTJAAN EIJKMAN

Christjaan EIJKMAN was distinguished by the award of the Nobel Prize for Medicine jointly with Sir Frederick HOPKINS, both of them by reason of their long and successful work in the realm of vitamin research.

(The following data are culled from a biographical sketch, placed at our disposal by Professor EIJKMAN shortly before his death.)

EIJKMAN was born, on August 11th, 1858, at Nykerk, a small town on the Zuyder Sea in Gelderland, Holland, where his father conducted a school for French. It was from his father that he received his elementary education, after the removal of the family to Zaandam, another town on the Zuyder Sea. He subsequently studied medicine at the University of Amsterdam (1875—1883), working meanwhile for a time as assistant at the Physiological Institute, where he prepared his graduation thesis on "Polarisation in the Nerves".

In 1883 he went to the Dutch East Indies as an army doctor, but was soon obliged to return on sick-leave; upon his recovery he studied bacteriology, as a pupil of FÖRSTER'S at Amsterdam and Robert KOCH'S in Berlin. In 1886 he was attached as assistant to the PEKELHARING-WINKLER Expedition, sent by order of the Dutch Government to the Malay Archipelago to investigate the nature of the "beriberi sickness", a native disease in those parts, which was just then taking fearful toll of the population and of Dutch soldiers and seamen. When the expedition returned home at the close of the following year, provision had been made for the laboratory established on their behalf to be transformed by the Colonial Government into a permanent "Pathological Institute of Batavia", and for EIJKMAN to be placed at its head. At the same time he undertook to conduct a medical school for training native physicians, himself lecturing there on physiology and organic chemistry.

Soon after starting scientific investigations on his own account, EIJKMAN had had occasion to observe an apparently epizoötic disease among fowls, which showed a certain similarity to the beriberi disease in human beings. When the other physicians of the expedition had established a general degeneration of the peripheral nerves (polyneuritis) as the basis of the latter illness, EIJKMAN found the same phenomenon to apply to the animal disorder he was studying. He, furthermore, deduced that it was caused by a practically exclusive diet of shelled and polished rice, but that an addition thereto of the bran that had been removed by the mechanical treatment of the rice restored its value as wholesome feed. On the strength of many varied tests he then managed to determine that the bran must contain a preventive and curative substance of unknown quality, an antineuritic principle to which FUNK subsequently gave the name of vitamin.

As is now universally recognised, this discovery — thanks also, in particular, to the collaboration of the late Dr. VORDERMAN — explained the ætiology of the beri-beri sickness in an altogether unexpected way. It also became the starting-point for establishing the nature of a whole group of diseases (the so-called avitaminoses), such as scurvy, Bright's disease, pellagra, xerophthalmy, and various others. As MAC COLLUM expresses it in his book, "The Newer Knowledge of Nutrition", "A new era of preventive medicine dates from the publication of his (EIJKMAN'S) paper in 1897".

During his eight years' sojourn at Batavia, EIJKMAN also made investigations in regard to the physiology of the inhabitants of the tropics, with special reference to blood, requirements of nutrition, basic metabolism, regulation of bodily warmth, and acclimatisation.

In the year 1896 EIJKMAN was repatriated for the sake of his health; two years later he was appointed Professor of Hygiene and Forensic Medicine at the University of Utrecht, an appointment he continued to hold until he had attained the age-limit of 70 years in 1928. Here he engaged in the study of various problems of hygiene and bacteriology and continued his vitamin research. He had the satisfaction of seeing anti-neuritic vitamin isolated as a pure, crystalline substance by his countrymen JANSEN and DONATH in the Batavia laboratory that had developed out of his own primitive research premises, and of confirming, by investigations of his own, the surprising efficacy of this substance even in diminutive doses.

EIJKMAN was member of the Royal Academy of Sciences at Amsterdam and of several other scientific societies in the Netherlands and abroad. He was likewise awarded the John Scott Medal of Philadelphia. The Nobel Prize was conferred on him (and concurrently on HOPKINS) "for his discovery of anti-neuritic vitamins".

EIJKMAN died on November 5th, 1930.

SIR FREDERICK HOPKINS

Sir Frederick Gowland HOPKINS, who must be regarded as one of the actual founders of vitamin research, was born at Eastbourne, Sussex, on June 20th, 1861. (The following account rests mainly on an auto-biographic sketch kindly placed at our disposal by Sir Frederick himself.)

At an early age HOPKINS lost his father, who had been an enthusiastic admirer of scientific progress; this loss adversely influenced the son's subsequent education, and it was not until his 27th year that his scientific training actually began, when in 1888 he was finally able to commence his medical studies at Guy's Hospital in London. It was only during his normal medical studies, moreover, that he frequented colleges; nor was he ever occupied in research under any particular teacher, the only biochemical laboratory in which he has ever worked being his own.

In London he graduated in philosophy in 1894. On the invitation of Sir Michael FOSTER he went to Cambridge in 1898 for the purpose of establishing the plan and curriculum of instruction in physiological chemistry there. In 1914 a special chair of biochemistry was instituted for him at Cambridge University. Ten years later a great private donation provided the means of establishing an adequately equipped biochemical institute under HOPKINS'S control, an institute which soon developed into an important and fertile seat of research. Since 1921 Professor HOPKINS has occupied the William Dunn Chair at Cambridge.

HOPKINS started with investigations on animal pigments and their connection with the substances of secretion, and later on turned his attention to uric acid, conceiving a novel method for its quantitative analysis. This method he also applied to a number of physiological and pathological problems.

In 1906 he published his first reports on the investigations he had made, in collaboration with his pupils, on the so-called "accessory factors of nutrition", of which he rendered a thorough and detailed account in 1912. It was HOPKINS who first alleged and proved the presence of vitally important nutritious substances in vegetable and animal food alongside those long recognised as such, albumen, fat, carbon hydrates, and salts. As early as 1906, in connection with his work on accessory foodstuffs, he declared that no member of the animal kingdom could live solely on albumen, fat, carbon hydrates and salts, and that the absence of accessory foodstuffs led to illnesses such as Bright's disease and scurvy. HOPKINS had even then envisaged the entire problem of vitamins, which has since become a special science, though the name of "vitamins" for those accessory foodstuffs was only selected at a much later date. It was not until 1912, in consequence of the publication of his "Experimental Biology", that general interest was accorded these important questions which HOPKINS had raised. At that time he based his inferences on the fact that by means of milk he could alter a diet otherwise fatal to rats in such wise as to entail the animals' recovery.

Later on, HOPKINS concentrated on the study of cellular metabolism, in which direction he did much successful work, partly by himself and partly in co-operation with a great number of younger investigators (the so-called "Cambridge School"), particularly in explaining the oxydation processes in the living cell and the enzymæ operating in this connection. In 1921 he discovered what is known as the catalysator of oxydation, present in all breathing cells, to which he gave the name of "glutathion".

In 1913 HOPKINS caused a special department to be allotted to biochemistry at Cambridge University and himself became the first professor to lecture on this subject. In the same year he was made President of the British Association and delivered an inaugural address on "The Dynamic Side of Biochemistry". From 1913 to 1918 he edited the annual biochemical reports for the Chemical Society.

HOPKINS was awarded the Baly Medal in 1915, the Royal Medal in 1918, the Cameron Prize of Edinburgh University in 1922, and the Copley Medal in 1926; he is honorary doctor of the universities of Oxford, Manchester, Dublin, Sheffield, Birmingham and Aberdeen, and member of numerous academies and other learned societies. In 1925 he was knighted. In 1917 he delivered the "Cronian Lecture" in the Royal Society.

The Nobel Prize for Physiology (which he shared with EIJKMAN) was awarded him "for his discovery of growth-promoting vitamins".

KARL LANDSTEINER

Karl LANDSTEINER was born in Vienna on June 14th, 1868. He studied medicine at Vienna University and took his doctor's degree there in 1891, after which he did chemical work in the laboratories of HANTZSCH at Zurich, E. FISCHER at Würzburg, and E. BAMBERGER at Munich, and completed his medical training at the Vienna „Allgemeines Krankenhaus". In 1896 he became assistant to Max von GRUBER at the „Hygienisches Institut" in Vienna; from 1898 to 1908 he was assistant to A. WEICHSELBAUM at the pathologic-anatomic institute of Vienna University. From 1908 to 1919 he was employed as chief dissector at the „Wilhelminenspital" in the same city, where he was meanwhile appointed professor-extraordinary of pathological anatomy at the university (1911). Having thereafter acted for three years as dissector at the R. K. Ziekenhuis of the Hague, Holland, he has since 1922 been member of the Rockefeller Institute for Medical Research in New York.

LANDSTEINER'S main field of scientific research has been that of the human blood, and he has succeeded in establishing and defining the nature and proportion of the individual blood-groups. His very numerous publications, to a considerable part compiled in collaboration with other authorities, include the following: „Über Agglutinationserscheinungen normalen menschlichen Blutes" (1901), „Über paroxysmale Haemoglobinurie" (with J. DONATH, 1904), „Zur Technik der Spirochaetenuntersuchung" (with MUCHA, 1906), „Zur Frage der Komplementbildungsreaktion bei Syphilis" (with R. MÜLLER and O. POETZL, 1907), „Übertragung der Poliomyelitis acuta auf Affen" (1909), „Untersuchungen über Komplementwirkung. — Haemolyse durch Kieselsäure und Komplement" (with H. ROCK, 1912), „Über die Aetiologie der Polymyositis" (Stockholm, 1917), „Über die Abhängigkeit der serologischen Spezifität von der chemischen Struktur" (with H. LAMPL, 1918), „Spezifische Serumreaktionen mit einfach zusammengesetzten Substanzen von bekannter Konstitution" (1920), "Production of heterogenic antibodies with mixtures of the binding part of the antigen and protein" (with S. SIMMS, 1923), "Differentiation of oxyhemoglobins by means of mutual solubility tests" (with M. HEIDELBERGER, 1923), "On the antigens of red blood-corpuscles" (with J. van der SCHEER, 1925), "Serological studies on the bloods of the primates" (with C. P. MILLER jr., 1925), „Über komplexe Antigene" (1927), "On Individual Differences in Human Blood" (with Ph. LEVINE, 1928), "Cell Antigens and Individual Specificity" (1928), "Serological Differentiation of Steric Isomers" (with J. van der SCHEER, 1928).

The Nobel Prize was conferred on him "for his discovery of the human blood groups," by which achievement he has provided physicians, through the possibility of blood-transfusion, with a new lifesaving means of operation.

NOBEL PRIZE for 1931

OTTO HEINRICH WARBURG

Otto Heinrich WARBURG, son of the physicist Emil WARBURG (1846—1931), was born at Freiburg, in the then Grandduchy of Baden, on October 8th, 1883. He first studied chemistry under Emil FISCHER and took his degree in chemistry in 1906 with a paper on polypeptides; thereupon he studied medicine under L. von KREHL, and graduated doctor of medicine with a paper on oxidation processes (1911). He has throughout been principally interested in vital processes, in so far as they may be studied by the methods of physics and chemistry, in which connection he endeavours to deduct such processes from the processes of the inanimate world (physics and chemistry). The exchange of energy in carbonic-acid assimilation, the metabolism of tumours, and the chemical constitution of oxygen-transferring ferments in breathing are the fields of research in which he has proved most successful.

WARBURG has never taught, devoting all his time and energy to scientific work, a circumstance he himself regards as highly fortuitous. He is at present working in Berlin-Dahlem at the „Kaiser Wilhelm-Institut für Zellphysiologie“, constructed by the Rockefeller Foundation in the year 1930.

By breeding small cancer tumours, the metabolism of which he accurately studied, WARBURG succeeded in establishing that cancer cells feed mainly on oxygen. By accommodating his test-animals in receptacles containing a very small amount of oxygen, he was able to cause large tumours to disappear. It turned out that the same results could be produced in the human body in cases of cancer, a fact that opened up favourable prospects for counteracting this disease.

In the realm of cellular metabolism and cellular respiration WARBURG has trodden altogether new paths. He was able to prove that every breathing cell contains a respiratory ferment, the nature of which he established as a ferrous organic dye, thus explaining mysterious relations between iron and oxidative metabolism in the cells. This applies quite particularly to cancer cells, to which WARBURG has devoted special attention; in this regard he has observed that they are capable of continuing to live and grow even if deprived of oxygen.

WARBURG'S chemico-physical "respiration models" constitute an important step forwards towards the liberation of vital processes from the riddles that continue to beset them as long as mankind is limited to specifically "physiological" forms of energy. It is for this reason that, sooner or later, his discoveries are bound to provide therapeutics with new and valuable instruments of healing.

The Nobel Prize was awarded him "for his discovery of the character and mode of action of the respiratory ferment."

NOBEL PRIZE for 1932

EDGAR DOUGLAS ADRIAN

Edgar Douglas ADRIAN was born in London on November 30th, 1889. He is the second son of Alfred D. ADRIAN, K. C., who was legal adviser to the Local Government Board, and whose father and grandfather had also been officials in the government service.

E. D. ADRIAN was educated at Westminster School and entered Trinity College, Cambridge, with a scholarship in science in 1908. He studied physiology for part II of the natural science tripos and was awarded a first class in 1911. The Cambridge laboratory was then a centre of great activity, made all the more evident by lack of adequate space. Its staff included LANGLEY, ANDERSON, GASKELL, W. B. HARDY, FLETCHER, BARCROFT, and Keith LUCAS; HOPKINS was engaged on his work on the vitamins and A. V. HILL had just begun to study the heat production of muscles.

ADRIAN'S first work was done in collaboration with Keith LUCAS. It was followed by an investigation of the "all or none" principle in nerves, for which he was elected to a fellowship at Trinity Colleg in 1913. He took a medical degree in 1915 and worked at clinical neurology, returning to Cambridge in 1919 to lecture on the nervous system. He was made Fellow of the Royal Society in 1923. Two years later, he began investigating the sense organs by electrical methods, and in 1929 he was made Foulerton Professor of the Royal Society.

His published works include two books, "The Basis of Sensation" (1927) and "The Mechanism of Nervous Action" (1932). In 1923 he married Hester Agnes PINSENT, a descendant of David HUME, the philosopher.

NOBEL PRIZE for 1932

CHARLES SCOTT SHERRINGTON

Charles Scott SHERRINGTON was born in London on November, 1861, and studied physiology at Cambridge under Michael FOSTER. His first paper on the nervous system was published in 1884. After an interval of pathological work at the Brown Institute in London, he was appointed professor of physiology at Liverpool University (1895). In 1905 he delivered the Silliman Lectures at Gale on The Integrative Action of the Nervous System," published in book-form a year later. In 1913/14 he left Liverpool and became Waynfleet Professor of Physiology at Oxford.

Besides the monograph mentioned above, he has published "Mammalian Physiology" (1916), "The Assaying of Brabantius and other Verses" (1925), and various papers in scientific journals.

The Nobel Prize was awarded jointly to Professor SHERRINGTON and A. D. ADRIAN for their discoveries regarding the function of the neurone.

THOMAS HUNT MORGAN

Thomas Hunt MORGAN was born at Lexington, Kentucky, U. S. A., in 1866. He attended the University of Kentucky, graduating in 1886; he then entered the Johns Hopkins University, where he studied morphology with Professor W. K. BROOKS and physiology with H. Newell MARTIN. In 1890 he received the degree of doctor of philosophy and was Bruce Fellow for the following year. In 1891 he was appointed associate-professor of biology at Bryn Mawr College, where he remained until 1904; he then became professor of experimental zoology at Columbia University, New York City. In 1928 he became head of the Kerckhoff Biological Laboratories of the California Institute of Technology at Pasadena, California.

In the last decade of the last century most students of zoology were interested in embryology, and more especially in experimental embryology. William ROUX, in particular, had drawn attention to the desirability of approaching the problems of development from a mechanistic standpoint ("developmental mechanics," as it was called) in contrast to the descriptive study of embryological phenomena that had been actively pursued for the preceding decades. MORGAN became greatly interested in this field, and spent the year 1894—95 at the Naples zoological station in friendly relations with Hans DRIESCH and Curt HERBST, who at that time were actively engaged in experimental embryology.

The cytological problems connected with this study were rapidly coming to the fore about this time owing to the speculation by August WEISMANN, to the demonstrations of Oscar HERTWIG of the significance of the nucleus in development, and to the cytological analyses of Theodore BOVERI. More and more attention was directed towards the rôle of the chromosomes in developmental phenomena. MORGAN was attracted by the means of experiments combined with chromosomal interpretations, and for several years published a number of papers dealing with these subjects.

At the same time, the favourable opportunity for examining another side of the developmental phenomena offered by a study of regeneration engaged his attention for several years, culminating in the publication of his book on „Regeneration.“

During his twenty-four years at Columbia University, his attention was directed towards the bearing of cytology on the broader aspects of biological interpretation. His intimate relations there with Professor E. B. WILSON offered exceptional opportunities to come into contact more directly with the kind of work carried on actively in the zoological section.

Familiarity with the rapidly developing field of cytological changes taking place during the maturation of the germ-cells undoubtedly prepared the way for the interpretation of linkage and crossing-over suggested in the early years of the present century.

In 1908 MORGAN discovered the two kinds of spermatozoa found in the male phylloxeran, one of them carrying the X-chromosome which the other lacks. The latter degenerates, while the former fertilises the egg of the sexual female. This explained why the individual arising from the egg (the stem-mother) is always a female. A study of the life-cycle of the parthenogenetic females also showed how the males arise at the end of the cycle. The eggs destined to give rise to males eliminate one of the two X-chromosomes in the polar body, while the other chromosomes simply divide, as in other parthenogenetic eggs of the same cycle.

The rediscovery of MENDEL'S paper in 1901 immediately aroused the interest of all students of experimental biology. Unfavourably situated for carrying out work in animal breeding, and lacking funds to make experiments with the larger animals then used in work of this kind, MORGAN sought for less expensive material that could be bred in the limited space at his command. Several years before, Professor CASTLE and his students had shown that the fruit-fly, drosophila, could be bred in laboratories under very simple conditions. MORGAN tried out this material for genetic work, and before long a number of striking mutants turned up. These were shown to follow MENDEL'S laws, and one of them proved to be sex-linked. This was interpreted to mean that it was present in the X-chromosome. Its inheritance strictly followed the known distribution of the X-chromosomes in successive generations. The following year other sex-linked characters were found, and study of the inheritance of two such characters in the same cross gave rise to the formulation of the principles of linkage and crossing-over both on a genetic and on a chromosomal basis. Linkage was declared to mean that genes carried by the same chromosome tend to remain together through successive generations. The exceptions to the linkage rule were interpreted as due to interchanges between homologous chromosomes (crossing-over). It was later shown that the different cross-over ratios that obtained when two genes in the same chromosome were studied could be explained on the assumption that the nearer together the two genes lie, the smaller is the chance of crossing-over when random interchanges take place between homologous chromosomes, and conversely, the further apart they lie, the greater is the chance of crossing-over. It became evident after a time that it was possible to construct linkage maps from, which it could be accurately predicted how any new character that arose would be inherited with respect to all other known characters, as soon as its crossing-over value with two of them was determined. More important was the conclusion, based on a study of closely situated genes, that the genes lie in linear order in each chromosome. Thus the localisation of the genes was determined, and the procedure by means of which their position is determined has become the basis for all later genetic work.

The work on drosophila, which grew more and more extensive, would not have been possible without grants by the Carnegie Institution of Washington, which began over twenty years ago and have continued to the present time. This brought into the work C. B. BRIDGES and A. H. STURTEVANT, who gave their entire time to this research and made invaluable contributions. In close collaboration were other workers at Columbia: MULLER, WEINSTEIN, METZ, GOWEN, PLOUGH, STARK, LYNCH, PLUNKETT, SCHULTZ, and LANCEFIELD, who also took an active part in the progress of the work. Valuable assistance likewise came from European investigators, who were usually on Rockefeller fellowships for a year or more. Even a partial list shows how widely geneticists were interested in the drosophila problems. Among those who spent a year or more with the group may be mentioned BONNIER (Sweden), BROZEK (Czechoslovakia), DOBZHANSKY, GABRITCHEVSKY, KARPETCHENKO (Soviet Russia), KOMAI, IMAI (Japan), LI CHEN (China), MOHR (Norway), NONIDEZ, ZULUEATA (Spain), OLBRYCHT (Poland), PADUA (Italy), STERN and NACHTSHEIM (Germany).

The genetics of drosophila is thus the outcome of the work of many heads and hands. In all the civilised nations of the world there are workers in the field. Their interest is due not only to the extraordinarily favourable material — ten days from egg to egg, the flies breeding throughout the year in the laboratory, more than 500 available mutant types, etc. — but is owing to the great amount of work already done, so that drosophily furnishes to-day the best type on which many of the more difficult genetic problems can be studied.

GEORGE HOYT WHIPPLE

George Hoyt WHIPPLE, son and grandson of New Hampshire physicians, was born at Ashland, New Hampshire, on August 28th, 1878. He was educated at Andover Academy and Yale University, where he graduated A. B. in 1900. His M. D. degree was received from Johns Hopkins University in 1905.

With the exception of one year (as pathologist at the Ancon Hospital, Panama, in 1907/08), WHIPPLE was at the Johns Hopkins Medical School from 1905 to 1914 as assistant in pathology, instructor, associate, and associate-professor. From 1914 to 1921 he was professor of research medicine at the University of California Medical School and director of the Hooper Foundation for Medical Research in the same university. Of the said medical school he was Dean in the year 1920/21. In the latter year he became Professor of Pathology and Dean of the School of Medicine and Dentistry in the University of Rochester.

The year spent in Panama under General William C. GORGAS and Dr. S. T. DARLING was given over to the investigation of anemia due to parasites, with particular reference to the lesions in the intestinal tract. Black water fever was also studied from the standpoint of histological material of unusual excellence.

As a junior in the department of pathology under Dr. WELCH at Johns Hopkins, WHIPPLE'S first problem dealt with body pigments related to liver necrosis produced by chloroform anesthesia. The object of this study was to get information on the repair and regeneration of liver cells following injury. This was studied from a number of different angles, and the capacity of a dog's liver to regenerate new liver cells was found to be practically limitless. At this time an interest developed in icterus, a condition which develops invariably in association with chloroform poisoning and liver injury. The route of the bile pigments coming from the liver into the blood was examined, and it was found that the lymphatic system had very little to do with this phenomenon. A study of bile pigments and their production outside the liver followed and was continued by means of bile fistulas. Dr. HOOPER collaborated with Dr. WHIPPLE in these studies.

After WHIPPLE'S removal to California, this study of bile pigments by means of bile fistulas was continued. It was soon found that hemoglobin production must be better understood to give a more complete comprehension of bile-pigment metabolism. The first experiments with anemia due to blood loss in dogs were begun in 1917. Dr. HOOPER and Mrs. ROBSCHEIT-ROBBINS collaborated in these early experiments. All the experimental work, including that relating to liver diet and blood regeneration, was done in California by short-anemia experiments.

In Rochester, whither he removed his anemia colony across the continent, WHIPPLE soon decided to use long-continued, uniformly sustained anemia periods due to blood loss and from this baseline to study effect of various factors added to the basal ration. In this way the potency of various diet factors could be accurately estimated. In this type of experimental anemia, liver was proved to be most efficient. Dr. F. S. ROBBINS collaborated in all this programme.

Dr. WHIPPLE has received the honorary degrees of D. Sc. of Colgate University (1927) and M. A. of Yale University (1927). In 1930, together with Dr. MINOT, Dr. WHIPPLE received the Popular Science monthly award; in 1934 he was awarded the William Wood Gerhard Gold Medal of the Pathological Society of Philadelphia.

He is a member of the National Academy of Sciences, the American Society for Experimental Pathology (of which he was president in 1925), the Association of American Physicians, the American Physiological Society, the American Medical Association, the American Association of Pathologists and Bacteriologists (over which he presided in 1930), Sigma XI, Alpha Omega Alpha, and Phi Beta Kappa. He is trustee of the Rockefeller Foundation and corresponding member of the Vienna Association of Physicians and the Budapest Royal Society of Physicians.

GEORGE RICHARDS MINOT

George Richards MINOT, a physician's son, was born on December 2nd, 1885, in Boston, Massachusetts, where his ancestor, George MINOT, had arrived from England in 1630. In his youth George R. MINOT was interested in lepidoptera and published two notes concerning butterflies. Studying at Harvard, he received the A. B. degree in 1908, M. D. in 1912, and honorary S. D. in 1928. After serving as medical interne at the Massachusetts general hospital, he worked at the Johns Hopkins hospital and medical school under W. S. THAYER and W. H. HOWELL. In 1915 he returned to Boston, being appointed assistant in medicine at the Harvard medical school and Massachusetts general hospital. Soon after his promotion to the upper staff of this hospital he accepted, in 1922, the position of physician-in-chief of the Collis P. Huntington Memorial Hospital of Harvard University, and later also was appointed to the staff of the Peter Bent Brigham Hospital. In 1928 he was elected professor of medicine at Harvard, director of the Thorndike Memorial Laboratory and visiting physician of Boston City Hospital. During his career in various capacities in the Department of Medicine he has constantly taught medical students and conducted clinical investigation.

MINOT'S interest in disorders of the blood commenced when he was a medical student, and he has published articles on many phases of the subject with a consideration of bone-marrow function underlying his observations. He has also written on arthritis, cancer, dietary deficiency, the social aspect of clinical cases, and other topics. He has contributed knowledge concerning coagulation of the blood, the blood platelets, and various hemorrhagic disorders, and has described an atypical familial hemorrhagic syndrome associated with prolonged bleeding-time. His blood studies in certain industrial poisonings have indicated means for early diagnosis and prevention. Leukemia, disorders of the lymphatic tissue, and polycythemia have commanded his interest as well as the anemias, to which subject his most significant contributions have been made. He first wrote on pernicious anemia in 1914, and in 1926 described, with W. P. MURPHY, the regular and strikingly beneficial effects of feeding daily adequate amounts of liver. This matter formed the subject of his Nobel Lecture. Since then, with Edwin COHN and associates, he has demonstrated the efficacy of certain fractions of liver, and shown the value of reticulocyte reactions in evaluating therapeutic procedures. He has also contributed information concerning gastro-intestinal function, iron therapy, and other aspects of anemia.

The Nobel Prize was awarded jointly to Professor MINOT, G. H. WHIPPLE, and W. P. MURPHY for their discovery of liver therapy against anemias.

WILLIAM PARRY MURPHY

William Parry MURPHY, a Congregational minister's son, was born at Stoughton, Wisconsin, on February 6th, 1892, attended various schools in Wisconsin and Oregon, and graduated A. B. from the University of Oregon in 1914. He then taught physics and mathematics for two years in secondary schools in Oregon, and spent one year at the University of Oregon Medical School, Portland, also acting as laboratory assistant in the department of anatomy. After attending a summer session at the Rush Medical School in Chicago, he entered the Harvard Medical School in Boston, where he held the William Stanislaus Murphy fellowship for three years, receiving the degree of doctor of medicine in 1922 (as of 1920).

After two years as house officer at the Rhode Island Hospital, he became assistant resident physician at the Peter Bent Brigham Hospital under Professor Henry A. CHRISTIAN for eighteen months, then junior associate, and later associate, in medicine at the same institution. He was made assistant in medicine at Harvard in 1924, and instructor in medicine in 1928.

He began the practice of medicine in 1923, and has carried on research in diabetes mellitus and diseases of the blood, having published about fifty papers on these subjects in scientific journals.

Dr. MURPHY was awarded, with Dr. George R. MINOT, the Cameron Prize in Medicine by the University of Edinburgh Medical Faculty in 1930 for work on pernicious anemia, the Bronze Medal of the American Medical Association in 1934, for a scientific exhibit consisting of charts and a motion-picture concerning the use of intramuscular injections of liver extract in the treatment of pernicious and hypochromic anemia and granulocytopenia, and the Nobel Prize in Physiology and Medicine in 1934 with Drs. G. R. MINOT and G. H. WHIPPLE. He is Decoration-Commander of the first rank of the Order of the White Rose, Finland, 1934.

MURPHY is a member of the American Medical Association, the Society for Experimentation in Biology and Medicine, the American

Society for Clinical Investigation, the Association of American Physicians, the Society for Research in Nutrition, and the „Deutsche Akademie der Naturforscher.“

HANS SPEMANN

Hans SPEMANN, eldest son of the bookseller and publisher Wilhelm SPEMANN, was born at Stuttgart on June 27th, 1869. Having for ten years attended the Eberhard-Ludwig College in his native town, he entered his father's line of business, but in 1891 decided in favour of the study of medicine. Up to his preparatory medical examination in the autumn of 1908, he studied at Heidelberg, where he was greatly attracted by comparative anatomy, as expounded by Professor Carl GEGENBAUR. The winter term of 1893/94 he spent in Munich, where he made friends with August PAULY. From the spring of 1894 till the autumn of 1908 he worked at the Zoological Institute of Würzburg, Franconia. Meanwhile, he graduated in zoology, botany, and physics under Theodor BOVERI, Julius SACHS, and Wilhelm RÖNTGEN, respectively, all of whom exercised great influence on his scientific development; in 1898 he became a lecturer in zoology. In the autumn of 1908 he was invited to the chair of zoology and comparative anatomy at Rostock, Mecklenburg, where he stayed for six years; he then became second director at the „Kaiser-Wilhelm-Institut für Biologie" in Berlin-Dahlem. Since the spring of 1919 he has been professor of zoology at Freiburg, Baden.

The Nobel Prize was awarded him "for the discovery of the organizer effect in embryonic development."

SIR HENRY DALE

Henry Hallet DALE was born on June 9th, 1875, in London, where his father was engaged in business. From Lyes School, Cambridge, he entered Trinity College with a scholarship in 1894, graduating through the natural-science tripos with physiology and zoology as his subjects. From 1898 to 1900 he held the Coutts-Trotter studentship in physiology at Trinity College, and worked in the Cambridge University laboratory of physiology under Dr. J. N. LANGLEY. In 1900 he entered St. Bartholomew's Hospital, London, with a scholarship, for the clinical part of the medical course, qualifying as B. Ch., Cambridge, in 1903. He became M. D. at Cambridge in 1909. Meanwhile he had been awarded the George Henry Lewes studentship in physiology, in which he carried out research under Professor STARLING at University College, London. It was here he met Otto LOEWI, with whom he formed a lifelong friendship. He next worked for four months under Paul EHRLICH in Frankfort-on-Main, returning to London as Sharpey scholar; this post he held for only six months, entering the Wellcome Physiological Research Laboratories as pharmacologist in 1904. Of these laboratories he was director from 1906 to 1914, during which period he began a series of researches, originating in an investigation of the pharmacology of ergot and continued for nearly six years with the chemical co-operation of George BAEGER. This study led from the characteristic effects of specific ergot alkaloids to others, found to be due to simpler bases incidentally present — tyramine and histamine. In the same connection, the oxytocic action of pituitary extracts was discovered. The action of histamine led to studies on anaphylaxis and on conditions of shock. Later on, acetylcholine was found as a constituent of certain ergot extracts, and an analysis of its action furnished, after an interval of nearly twenty years, the basis for recent researches, extending the application of Otto LOEWI'S discoveries. This was recognised in the joint award of the Nobel Prize.

In 1914 DALE was elected to the fellowship of the Royal Society and appointed to the research staff of the newly-constituted National Institute for Medical Research as director of the department of biochemistry and pharmacology. The outbreak of the war in the following month postponed all arrangements for the housing of the new institute, and distributed its staff on various national duties, to reassemble, at Hamstead, in 1920. In 1928 DALE was made director of the Institute.

Dr. DALE was knighted in 1932.

NOBEL PRIZE for 1936

OTTO LOEWI

Otto LOEWI was born at Frankfort-on-Main on June 3rd, 1873, educated in his native town, and pursued his university studies first at Strassbourg, then in Munich, and finally at Strassbourg again, where he took his doctor's degree in 1896, with a dissertation he had prepared considerably earlier, when studying at SCHMIEDEBERG'S pharmacological institute. He then worked first in chemistry with Martin FREUND at Frankfort-on-Main, and then in physiological chemistry with Franz HOFMEISTER at Strassbourg. In 1897/98 he was Karl von NOORDEN'S assistant at the Frankfort municipal hospital, and from 1889 to 1899 assistant at the pharmacological institutes of Marburg, Hesse, and of Vienna, at the latter university under Hans Horst MEYER. In 1900 he became lecturer at Marburg, and in 1906 professor extraordinary in Vienna. In 1901/02 he had worked for some months under Ernest H. STARLING in London. Since 1909 he has been professor of pharmacology at Graz.

His scientific work was at first principally in the field of the physiology and pharmacology of metabolism (albumen-nuclein-carbohydrate). In this direction his main success was the discovery, since then repeatedly confirmed, that the animal body is capable of constructing albumen out of abiuretic albumen-decomposition products („Über Eiweißsynthese im Tierkörper,“ 1902). He next engaged in the physiology and pharmacology of the renal function, of the vegetative nerve system, and of ion effects. Complex experimental investigations also regarded the mechanism of the digitalis effect. In 1921 he discovered the chemical transference of the nerve effect, a result which was further developed by him and his collaborators in the next few years. Prior to LOEWI'S discovery, it had been wholly unknown how nerve-irritation could functionally influence a reflex organ, or, in other words, how the irritation of a nerve could be transferred from the nerve end to the reflex organ. It had been generally assumed that a wave of irritation spread from the nerve fibre to the organ in question, but LOEWI discovered that the nerves do not directly affect the organs concerned, but that the immediate result of the nerve irritation is a liberation of chemical matter which then indirectly entails the functional alteration in the reflex organ, which is characteristic of nervous effects. In due course the chemical character of these substances was furthermore established.

It was for these discoveries, which gave a tremendous incentive to the investigation of a new field of biology, that LOEWI received the Nobel Prize for Physiology and Medicine in 1936.

LOEWI has also received the Austrian „Ehrenzeichen für Kunst und Wissenschaft.“ He is honorary member of the London Physiological Society, the Harvey Society of New York, and the “Società italiana di Biologia sperimentale,” member of the „Deutsche Akademie der Naturforscher“ (Halle), and corresponding member of the „Gesellschaft der Ärzte“ (Vienna), the „Wiener biologische Gesellschaft,“ the “Société de Biologie” (Paris), and the „Gesellschaft zur Förderung der gesamten Naturwissenschaft“ (Marburg). He has been awarded the physiology prize of the Royal Academy of Sciences in Bologna and the Lieben prize of the Vienna Academy.

ALBERT DE SZENT-GYÖRGYI

Albert de SZENT-GYÖRGYI was born in Budapest on September 16th, 1893. His father was a landed proprietor, while his maternal grandfather and uncle were both professors of anatomy at Budapest University. Upon completing his education in Budapest, he entered the medical faculty of Budapest University in 1911, starting scientific research in his uncle's laboratory during his first year as a student. By the time he had reached his third year at the university, he had already published a series of histological papers, with special reference to the structure of the vitreous body, for the examination of which he developed methods of his own. His studies were interrupted by the war, during which he saw active service on the Russian and Italian fronts. He was decorated for bravery and, being wounded, was enabled to finish his studies in 1917, in which year he also married the daughter of the Hungarian postmaster-general.

Anatomy failing to satisfy him, SZENT-GYÖRGYI repaired at the close of the war to Pozsony (now Bratislava in Czechoslovakia) to assist the pharmacologist, G. MANSFELD; very soon, however, the occupation of the town by the Czechs forced the Hungarian staff of the university to abandon it. For a short time he went to Prague, to study electro-physiology under Arnim von TSCHERMAK at the German university there. He next worked with L. MICHAELIS in Berlin, and finally proceeded for a couple of years to Hamburg, to engage in physico-chemical studies at the „Tropenhygienisches Institut.“ For two further years he was assistant at the pharmacological institute of Leyden University, Holland, and thereupon in the same capacity at the physiological institute of the University of Groningen. Here, in connection with his study of cellular respiration, he started serious work in chemistry, describing the dovetailing of oxygen and hydrogen activation, and making his first observations of codehydrases and the polyphenol-oxydasis system of plants. At Groningen he lectured on bio-chemistry. At this time, too, he first observed the existence of a reducing substance in vegetable and animal tissues.

In 1927 he gained a Rockefeller fellowship and went to work with F. G. HOPKINS at Cambridge, where, in the biochemical laboratory, he isolated the reducing substance now known as ascorbin acid. In the following year he repaired to Rochester, Minnesota, to isolate ascorbin acid from accessory kidneys in greater quantities with E. C. KENDALL in the Mayo Foundation. In 1929 he returned to Cambridge, where, jointly with DRURY, he described the pharmacological activity of the nucleotides. In 1930 he was appointed to the chair of medical chemistry at the University of Szeged, Hungary, in addition to which he has occupied the chair of organic chemistry since 1935.

At Szeged he made his first observations regarding the anti-scurvy activity of ascorbin acid. These were followed by the discovery that paprika (capsicuum annuum) is an ample source of vitamin C. This led to the preparation of greater quantities of the said substance, the monoaceton derivative of which finally established its identity with vitamin C. The quantities of substance thus prepared also opened up the way for work in other scientific centres.

The problem that has mainly occupied SZENT-GYÖRGYI in the last decade is the mechanism of biological oxidation. The discovery of ascorbin acid emanated from this study of oxidation processes. Within the last four years SZENT-GYÖRGYI has discovered the catalytic function of C_4 dicarbon acids. In connection with these studies, he discovered "cytoflav," also known as "flavin." Quite recently, the analysis of the vegetable peroxydasis system led him to establish the biological activity and probable vitamin nature of certain flavones (phenyl-benzo pyranes, vitamin P).

SZENT-GYÖRGYI'S observations to date have been collected in some 140 papers, mostly published in English and German.

In 1935 he was "visiting professor" of Harvard University. He is member of many Hungarian and foreign scientific societies, and has delivered numerous lectures in various centres of science. He is permanent secretary to the Hungarian Physiological Society.

Albert de SZENT-GYÖRGYI has constantly worked for the maintenance and increase of international relations in science. The Nobel Prize was conferred on him for his discovery of the P. C. vitamin in paprika.

IV.

BEARERS OF THE PRIZE FOR LITERATURE

NOBEL PRIZE for 1901

RENÉ SULLY PRUDHOMME

René François Armand SULLY PRUDHOMME was born in Paris on March 16th, 1839. His original intention to prepare for a technical career was soon abandoned in favour of philosophical and juridical studies.

Having succeeded at any early age in finding recognition and appreciation as a poet on the part both of the general public and of severer critics, he was the first to whom the Vitet Prize for poetry was awarded; in 1881 he was made a member of the French Academy; he was likewise elected officer, and subsequently commander, of the Legion of Honour.

His writings, both poetry and prose, are characterised by formal beauty and accuracy, and by a peculiar, stoico-pessimistic outlook on life. The first collection, entitled "Stances et poèmes" (1865), was followed by a volume of sonets, "Les Epreuves" (1866), "Les Solitudes" (1869), "Les Destins" (1872), and "Les Vaines Tendresses" (1875); a philosophically didactic strain is apparent in "La Justice" (1878) and "Le Bonheur" (1888).

Other poetic productions of his were "Les Ecuries d'Augias" (1867), "Croquis Italiens" (1868), "Impressions de la Guerre" (1872), "La Révolte des Fleurs" (1872), and "Le Prisme" (1886).

His prose writings dealt in part with the philosophy of art, e. g. "Expression dans les Beaux-Arts" (1890) and "Reflexions sur l'Art des Vers" (1892), while others, particularly his articles in the "Revue des Deux Mondes" (1890) and in the "Revue de Paris" (1894), were devoted to the ideas of the great French savant and mathematician, Blaise PASCAL, as was also, in later years, PRUDHOMME'S book "La vraie réligion selon Pascal" (1905). Two other later works were of a religious-philosophical nature: "Que sais-je? Examen de Conscience" (1896) and the "Psychologie du libre arbitre" (1907).

In the year 1901, PRUDHOMME published his "Testament poétique"; his collected "Oeuvres" appeared in eight volumes from 1883 to 1909.

PRUDHOMME was awarded the first literary Nobel Prize "in recognition of his excellece as a writer, particularly of poetry, which was characterised by exalted idealism, artistic perfection, and a rare combination of soul and genius".

SULLY PRUDHOMME died, on September 7th, 1907, at his castle of Chatenay near Paris.

THEODOR MOMMSEN

As the statutes of the Nobel Endowment point out, "the conception of literature is to be understood to embrace not only belletristic works but also other writings, provided they possess literary value by reason of their form and elaboration". Thus, the second writer to be awarded the Literature Prize was no poet, but an historian, the famous author of the „Römische Geschichte", universally recognised as one of "the most important works of latter-day German historical literature". The biographical sketch published (in "Les Prix Nobel 1902") on the occasion of the award, refers to the writer's "vivacity of narrative and boldness of ideas", and calls his book "an absolute literary masterpiece".

Theodor MOMMSEN, the son of a German pastor, was born at Garding, Slesvig, on November 30th, 1817. He studied law and classical philology at Kiel, and worked for a time as a private teacher at Altona near Hamburg. From 1844 to 1847 a scholarship granted by the Berlin Academy enabled him to travel in France and Italy. Having for a short while edited a newspaper at Rendsburg, Slesvig, he was appointed professor-extraordinary in law at Leipsic University, which post, however, he forfeited two years later (1850) by having joined the Democratic Party. He repaired to Switzerland, where in 1852 he became professor of Roman Law at Zurich University; thence he removed in the same capacity to Breslau in 1854. In 1858 he was appointed professor of ancient history at the university of Berlin; here he also collaborated with W. HENZEN in conducting the "Corpus inscriptionum Latinarum", and was subsequently editor of the "Auctores antiquissimi" of the "Monumenta Germaniæ historica".

From 1873 to 1882 MOMMSEN was member of the Prussian Parliament, belonging first to the National-Liberal Party and later on to the Liberal Union. From 1874 to 1895 he was permanent secretary of the Prussian Academy of Sciences.

MOMMSEN'S chief work, the „Römische Geschichte", reaches down to the year 46 B. C.; volumes 1, 2, and 3 first appeared in 1854/55, volume 5 in 1885; the fourth volume, which was to have dealt with the imperial era, was unfortunately never published, so that the great work remained a torso.

Among MOMMSEN'S other important works were his „Oskische Studien" (1845/46), „Die unteritalienischen Dialekte" (1850), „Die römische Chronologie bis auf Caesar" (1858), the „Geschichte des römischen Münzwesens" (1860), „Römische Forschungen" (1863—1879, in two volumes), as also collected fragments of pre-Justinian law (1861) and other valuable documentary publications; fundamental importance, moreover, attaches to his „Römisches Staatsrecht" (1871—1888, in three volumes) and „Römisches Strafrecht" (1899).

His „Reden und Aufsätze" appeared in 1905, and his „Gesammelte Schriften" (in seven volumes) in 1909.

The Nobel Prize was awarded MOMMSEN as the "greatest living master of our times in the art of historic narrative, with special reference to his monumental history of Rome".

It is of interest to point out, a fact not generally known, that in his youth MOMMSEN actually wrote some pœtry; in the „Liederbuch dreier Freunde", published in 1843, he complained that, owing to the circumstances of the times,

„vor den Folianten und der Prose
nicht jede Knospe sich erschloß zur Rose",

while in advanced years the artistic side of his nature, which had fostered his personal friendship for Theodor STORM and his admiration of MÖRIKE, induced him to translate various Italian poetical works into German; the poets in question were GIACOSA and CARDUCCI, the latter subsequently destined himself to gain the literary Nobel Prize.

Obviously MOMMSEN was accorded numerous honours and distinctions. Various academies elected him honorary member, and in 1896 he was presented with the "freedom" of the City of Rome.

MOMMSEN, an octogenarian at the time of the Nobel Prize award, retained his full health and undiminished vigour until his death at Charlottenburg, Berlin, on November 1st, 1903.

NOBEL PRIZE for 1903

BJÖRNSTJERNE BJÖRNSON

BJÖRNSON was born at Kvikne in Österdalen, Norway, on December 8th, 1832. His father was a Lutheran pastor, his mother an aunt of the Norwegian composer, Richard NORDRAAK. In 1838 the family quitted the lonely mountain village where Björnstjerne had been born and settled in Romsdalen, a coastal fjord-district inhabited by a lively, intelligent race, destined most favourably to influence the fancy of the gifted boy. At the age of eleven he was sent to school at Molde, described by him as a "little floral town", and in 1850 to Oslo (then "Christiania") to HELTBERG'S private college, popularly termed the "student factory", where IBSEN was one of his schoolfellows. In 1852 he began to attend the university, and at the same time started contributing sketches and critical essays to various newspapers. In this connection, his energetic and somewhat aggressive nature led him to champion the emancipation of the Norwegian theatre from Danish tutelage.

Here it was, too, that his poetic bore its first fruits. In 1856 he removed to Copenhagen and joined a literary club, which led to his adoption of GRUNDTVIG'S educational principles: in articles and addresses, which latter brought his great oratorical gifts to the fore, he zealously advocated the institution of popular universities in Denmark, Sweden, and Norway. From 1857 to 1859 he was a theatrical manager and editor at Bergen, Norway, and thereupon for one year editor of the "Aftonbladet" at Oslo. He then spent two years in Rome, whence he returned in 1862. In the following year the Norwegian Storthing voted him an annuity, which relieved him of all further pecuniary cares. For two years he conducted the principal theatre at Oslo, and in 1866 edited the illustrated paper, "Norske Folkeblad", acting simultaneously as co-editor of the Danish periodical, "For Idé og Virkelighed", published in Copenhagen. From 1873 to 1875 he was once more in Italy, but in the latter year he purchased an estate at Aulestad, Gudbrandsal, where he thenceforth resided. Repeatedly invited to lecture, he dealt with political, social, ethical, and linguistic problems both in Norway and abroad, particularly in the United

States. He was an enthusiastic advocate of the political emancipation of Iceland, and in no less a degree of an independent Norwegian republic, and the dissolution of the personal union with Sweden. In his „Signalfehde“ he championed the spiritual adherence of the Scandinavian people to German leadership. One of the greatest orators of his day, he was able to put across his politically radical views to a considerable extent.

As a bellestristic writer, BJÖRNSON first established his reputation by three novels descriptive of Norwegian peasant life, "Synnöve Solbakken" (1857), "Arne" (1858), and "En glad gut" (1860). At the same time, his dramatic genius first bore fruit, giving signal proof of eminent, plastically formative powers in his earlier plays, "Mellem slagene" (1857), "Halte Hulda" (1858), "Kong Sverre" (1861), and the trilogy "Sigurd Slembe" (1862).

When he had definitely returned home and settled in the Gudbrandsdal he wrote numerous poems, historical epics, patriotic songs, and lyrical portraits of contemporaries, raising himself to the rank of the foremost Norwegian lyric poet of his day.

The most outstanding works of this epoch were the novels and short stories entitled "Jarnbanen og kirkegarden" (1866), the moralistic novel "Fiskerjenten" (1868), the rural tale "Brudeslaatten" (1872), and the novel "Magnhild" (1877), as also the dramas "Maria Stuart i Skotland" (1864), "De nygifte" (1865), and "Sigurd Jorsalfar" (1872), and the highly realistic plays "Redaktören" and "En fallit" (both 1875). In 1868, moreover, he published his lyrics in a collected form as "Digte og Sange"; they were reprinted, with additions, in 1880 and again in 1890. The year 1870 saw the publication of "Arnljot Gelline", a drama in romantic verse.

His last and most fertile period was productive of the novels "Stöv" (1882), "Det flager i byen og pa havnen" (1884), and "Pa Guds veie" (1889), the short story "Mary" (1906), and the plays "Det ny system" (1879), "Over Evne" (1883; the sequel in 1895), "Laboremus" (1901), "Pa Storhove" (1902), "Daglannet" (1904), and "Nar den ny vin blomster" (1909).

When in 1903, "in recognition of his great, noble, and varied poetic activity, distinguished throughout by freshness of inspiration and by a rare purity of soul", the Nobel Prize for Literature was handed him, BJÖRNSON, in returning thanks, made a spirited attack on the theory of “art for art’s sake”, pointing out how important it was that art and literature should never depart from a recognition of good and evil. His conviction, he said, had always been optimistic, it being the true mission of all art to strengthen mankind for the struggle of life.

BJÖRNSON died in Paris on April 26th, 1910.

FREDERI MISTRAL

Frederi MISTRAL, the bard of present-day Provence, was born at Maillane, Bouches-du-Rhône, on September 30th, 1830. It was while at school at Avignon, incited by the example of his teacher, Josephe ROUMANILLE, that he discovered his poetic talent, his love for his Provençal home, with its important medieval literature and its fine, sonorous language, awakening in him the desire to emulate his preceptor in regaining for the Provençal idiom the place it had forfeited among the poetic languages of Europe.

At Aix, the ancient capital of Provence, he completed his study of the law, but eschewed pursuing the career of a lawyer, for which he had been prepared, and soon came to devote himself entirely to his ideal poetic mission, save for the care of the rural estate he had inherited upon his father's death.

MISTRAL has in very truth become the poet of present-day Provence; he was destined to see his boyhood's dreams fulfilled.

He started as a lyric poet with a collection of verses, "Li Prouvençalo." His first idyll, "Mirèio" (1859), a glorification of rustic life, was received with extraordinary enthusiasm and, in 1861, awarded a prize by the French Academy. It was followed by the epic poem "Calendau" (1867), which also made MISTRAL'S name known far and wide. Under the title of "Lis Isclo d'or" (1875) he published a collection of romances and songs. "Nerto" (1884), a story in verse, deals with incidents from the history of the Papal residence at Avignon; it met with a welcome as enthusiastic as that accorded to his "Mirèio." Together with the latter and with "Calendau", "Lou pouèmo dou Rone" (1897) may be said to make up an epic trilogy. In all his poems MISTRAL sings the praises of his beloved Provençal home. Great lyrical beauty likewise characterises his tragedy, "La Rèino Jano" (1890).

MISTRAL founded and conducted a great movement, known as "Félibrige," for the development and reanimation of the language of his native region. To this aim he devoted twenty years of his poetic activity, *inter alia* producing the great neo-Provençal dictionary, the

"Tresor dou Félibrige", in two volumes between 1879 and 1886, thereby erecting a lasting monument to the glory of the "lenge d'O" (i. e. "langue d'oc"). For this achievement the "Institut de France" awarded him the Reynaud Prize. The universities of Halle and Bonn conferred upon him the title of honorary doctor.

The award of the Literary Nobel Prize in favour of Frederi MISTRAL (jointly with ECHEGARAY) was made "in view of the fresh spontaneity, the brilliance and true art of his verses, which so faithfully portray the landscape and rustic life of his home, as also in view of his significant activity as a Provençal philologist." The means accruing to him through the Nobel Prize award MISTRAL employed for the endowment of the "Muséon Arlaten" at Arles.

His "Memoirs et Récits" have been translated into various languages; in the conversational tone of a popular raconteur, MISTRAL therein relates, with much humour and fine characterisation, of his peasant ancestors, his boyhood at Maillane, his schooling at Avignon, and his studies at Arles. The main contents of the book, meanwhile, are obviously a survey of his life-work, the reanimation of the Provençal language and of the ancient culture and usages of his native country, i. e. the great national movement of "Félibrige." Many popular songs and legends figure in this book.

MISTRAL died at Maillane on March 25th, 1914.

NOBEL PRIZE for 1904

JOSÉ ECHEGARAY

Don José ECHEGARAY was born in Madrid on April 4th, 1833. He studied at the universities of Murcia and Madrid, devoting himself first to mathematics and mechanics and later to political economy and the science of finance. On these subjects he also appeared as a writer. The revolution of 1868 made him an active politician: he became deputy to the Cortes and, in 1873, "Director general de Obras publicas y los Ministerios de Instruccion."

In the following year, however, he retired from public life, and thenceforth devoted himself entirely to dramatic composition. A trained mathematician and technician, and a prominent sociologist and statesman, he reaped merited success with his very first drama, "La esposa del vengador," which was performed in Madrid in 1874, and has since been translated into various foreign languages; it opened up for him a brilliant literary career and for Spanish dramatic art a period of magnificent restoration. More than 60 plays from his pen were performed in due course on the Spanish stage.

The second of his dramas to be performed, "En el puño la espada" (1875) was as successful as his first. He is best known, however, both in Spain and abroad, for the third of his dramas in verse, "Ó locura ó santitad" and possibly no less so for "El gran Galeoto" (both 1877); the latter ran through five editions in the first few months, and resulted in a national subscription in favour of the dramatist. In regard to his verse-dramas, mention may still be made of "En el seno de la muerte," (1879), "La muerte en los labios" (1880), "Conflicto en dos deberes" (1882), which of all his plays is the most characteristic of himself, and the oft-performed and greatly appreciated "Vida alegre y muerte triste" (1889).

His best prose plays were "Dos fanatismos" (1887), "Lo sublime en lo vulgar" (1888), "La realidad y el delirio" and "Los Rigidos" (both 1889), "Siempre en ridiculo" (1890), "Un critico incipiente" (1891), "Mariana" (1892), "El poder de la impotencia" (1893), "Mancha que limpia" and "El estigma" (both 1895), and "La duda" (1898).

For his bold and lively fancy, and the choice of his subjects ECHEGARAY must be rated as romanticist; to some extent his plays show the influence of the younger DUMAS, his later productions also that of IBSEN. Above all, he was a master of exposition, and thoroughly succeeded in enthralling his public by his originality, wit, and art of individualisation.

His success was spectacular, and the admiration vouchsafed him by his compatriots altogether frenzied. In 1911 he was awarded the Order of the Golden Fleece.

The Nobel Prize, which he shared with MISTRAL, was awarded him "in view of his brilliant and comprehensive literary activity, which has, in an independent and original way, reanimated the great traditions of the Spanish drama."

In 1885 a selection of his dramatic works appeared in two volumes.

ECHEGARAY died in Madrid on September 14th, 1916.

HENRYK SIENKIEWICZ

Henryk SIENKIEWICZ was born on May 4th, 1846, in the village of Wola Okrzejska near Lukow, in what was then the Russo-Polish government of Siedlce. He studied at Warsaw, and made his first literary debut with descriptive letters contributed under the pseudonym of Litwos to various Polish periodicals in the course of a journey through France, England, and North America (1876). About the same time he reaped some success in his native country with short stories of a realistic nature, such as "Hania", "Szkice weglem," "Janko muzykant," "Bartek zwyciecyn," and the touching emigrant story "For Daily Bread."

After his return to Warsaw he set himself to study the history of his native country; the outcome of these studies was a great trilogy of historical novels, based on events in the Polish history of the 17th century. These great narratives, which made SIENKIEWICZ the favourite author of the Polish people, were "Ogniem i mieczem" ("Fire and Sword," 4 vols., 1884), "Potop" ("Deluge," 6 vols., 1886), and "Pan Wolodyjowski" (3 vols., 1887/88). They have been translated into all European languages, and by their thrilling action, heartfelt patriotism, spirited style, and gorgeous description of the historical background cause SIENKIEWICZ to rank as the foremost Polish exponent of the romantic novel in modern times.

Later works from his pen were the social-psychologic, somewhat ironical modern novel "Bez dogmatu" (2 vols., 1891), the propagandistic novel "Rodzina Polanieckich" (1894), and the colossal historical romance "Quo Vadis?" (1895); the last-named, dealing with the Rome of Nero's day, established the world-fame of the author beyond a doubt.

SIENKIEWICZ subsequently returned to Polish history with his novel "Krzyzacy" (1900), followed in 1906 by "Na polu chwaly" ("On the Field of Honour") a glorification of the Polish national hero, Jan Sobieski.

It was not only in his own country that SIENKIEWICZ was made the object of honours and distinctions: practically all Slav academies elected him honorary member; he was likewise made a knight of the Legion of Honour. The Nobel Prize was conferred on him "in view of his greatness as an epic narrator." On the occasion of his twenty-fifth jubilee as a writer a national subscription was made throughout Poland, with the proceeds of which the estate of his ancestors, with the castle of Oblegorck in the government of Kielce, was purchased for him as a gift from his compatriots.

SIENKIEWICZ died on November 15th, 1916, in Switzerland, where he had elected to reside during the war. His body was first interred at Vevey on the Lake of Geneva, but was removed to Poland in 1924, and given solemn burial in Warsaw.

NOBEL PRIZE for 1906

GIOSUÉ CARDUCCI

Giosué CARDUCCI, son of a physician, was born at Valdicastello, in the then independent duchy of Lucca, on July 27th, 1835. At an early age, he began to take a keen interest in the literature of the ancients and in that of the Italian poets Dante, Tasso, and Alfieri. Lucca having been incorporated in Tuscany in 1847, CARDUCCI went to study at the university of Pisa, where in 1855 he graduated doctor of philosophy. After a few years occupied in private teaching, he was appointed to the chair of Italian literature at the university of Bologna (1861), a post he continued to hold for more than 40 years.

Of his writings on the history of literature, the "Studi letterari" (1874), „Bozzetti critici e discorsi letterari" (1876), and his "Storia del giorno di Parini" (1892) deserve special mention; he also edited works of classic Italian poesy, including the poems of Lorenzo de' Medici; the year 1881 saw the publication of his collection, "La poesia barbara nei secoli XV e XVI."

His chief importance, meanwhile, naturally lies in his own poetic works. CARDUCCI is considered the greatest of Italian poets in the last hundred years; his poems are distinguished by vigorous thought, brilliant style, and great beauty of language.

Figuring at first as a vehement opponent of the church, nay, even of religion altogether, he was subsequently no less ardent in his championship of the patriotic-irredentist cause in the struggle against Austria.

His early poems were the "Rime," which appeared in 1857, "Juvenilia" (1863), and his "Inno a Satana," which earned him the sobriquet of an "infamous advocate of the devil." There followed further "Poesie" and "Giambi ed Epodi" in 1871, "Nuove Poesie" two years later, and "Satana e polemiche sataniche" in 1879. In his "Odi barbare" (1887), CARDUCCI aroused considerable criticism by his revival of antique meters; a second series appeared in the following year as "Nuovi odi barbare," followed by "Terze odi barbare" in 1889. His last collection of poems was called "Rime e ritmi" and appeared in 1901. A complete edition of his writings was published in 20 volumes, from 1889 to 1909.

CARDUCCI was granted the "freedom" of the city of Bologna; he was nominated Senator in 1890, and was for a short time also a deputy to the Italian Parliament.

The literary Nobel Prize was awarded him "not only in view of his great wealth of knowledge and his critical research, but in particular in veneration of the plastic energy, freshness of style, and lyric force distinguishing his poetic masterpieces."

Giosué CARDUCCI died at Bologna on February 15th, 1907.

NOBEL PRIZE for 1907

RUDYARD KIPLING

Rudyard KIPLING, "poet laureate of the Seven Seas," was born on December 30th, 1865, at Bombay, where his father, the English sculptor, painter, and writer, John Lockwood KIPLING, long resided as director of a museum. Rudyard was educated at the United Service College at Westward Ho, Bideford, Devonshire, but elected to return to India in 1882; here he had occasion to tour and explore the country as collaborator of the "Civil and Military Gazette" of Lahore and, as from 1887, as editor of the "Pioneer" of Allahabad. These wanderings he described in "Stalky and Co.," a book for boys (1899), as also in many other stories. Subsequently he went farther east, in particular to Japan, visited South Africa and Australia, and spent seven years in North America.

In his numerous short stories KIPLING graphically describes the life and customs of the Indian natives and the Anglo-Indian residents in Great Britain's eastern empire, though not altogether to the exclusion of other subjects. The first six years of his literary activity saw the publication of his "Departmental Ditties" (1886), "Plain Tales from the Hills" (1887), "Soldiers Three," "In Black and White," "The Story of the Gadsbys," "Under the Deodars" (all these in 1888), "Wee Willie Winkie" (1889), "Life's Handicap" (1890), and "The Light that Failed" (1891).

Perhaps his most salient prose creation was "The Jungle Book," published in 1894, followed a year later by "The Second Jungle Book." This most original of KIPLING'S works was furnished with illustrations contributed by his father. The great degree of realism displayed by the author in these animal fables is idealised by the mystic relation in which the beasts and their experiences stand to nature. There is hardly a language into which the "Jungle Books" have not been translated.

Another very widely-read book of his is "Kim," a "novel of modern India," published in 1901. But in spite of the great popularity of his stories KIPLING'S chief triumphs may be said to have been gained by his poems, the best of which, such as "The Ballad of East and West," "The Recessional," and "If," are on a very high level indeed. Though much of KIPLING'S verse is remarkable mainly for its popular appeal, he is, in his best poetic efforts, unsurpassed for vigour of diction and imaginative power. In both his prose and his verse he was the champion of the British soldier and the advocate of British imperialism. His poems appeared in a collected form in 1923.

KIPLING was honorary doctor of Oxford, Durham, and Toronto. The Nobel Prize for Literature was conferred on him "in view of the power of observation, the original fancy, and the virile force of conception and delineation which characterise the writings of this world-famed author."

Rudyard KIPLING died on January 18th, 1936.

RUDOLF EUCKEN

Rudolf Christoph EUCKEN was born at Aurich, East Friesland, on January 5th, 1846. He studied philosophy, classical philology, and history at the universities of Göttingen and Berlin. After teaching for some years at secondary schools, he was appointed, in 1871, professor of philosophy at Bâle University, whence he went, in the same capacity, to Jena in 1874. Here he continued to lecture, declining various flattering invitations to other seats of learning, until the age-limit for his academic activity was finally reached in 1920.

Occupied with philosophical problems since his earliest youth and keenly interested in all their aspects, he disapproved of the critical and positive direction in philosophy, and more and more inclined to an idealistic, metaphysical attitude, which he championed in the spirit of modern Protestantism. Thus, while by no means disregarding the value of a natural-scientific outlook on things, he deemed it insufficient for his philosophic study of life. Convinced of the existence of a hyper-subjective, superior spiritual world, he endeavoured to furnish proof thereof in his book „Die Einheit des Geisteslebens in Bewußtheit und Tat der Menschheit“ (1888), contending that this divine reality of the spirit is something we become aware of psychologically, but must specially acquire by a free expression of personality; in this way, he opines, man contributes to the development of his "cosmic self," a force which finds expression in spiritual progress on earth in the form of a super-natural, super-temporal divine power.

In this fine idealism, meanwhile, EUCKEN did not content himself with the mere imagination of super-natural spiritual relationships; he also demanded that life ought to be based on the cognition and appreciation thereof. This endeavour once more to bring philosophy into closer touch with human life led to the compilation of his books „Der Kampf um einen geistigen Lebensinhalt“ (1896, frequently reprinted), „Grundlinien einer neuen Lebensanschauung“ (1907), „Der Sinn und Wert des Lebens“ (1908), „Erkennen und Leben“ (1912), and „Mensch und Welt“ (1918). All these saw several editions, many of them being translated into foreign languages. So great was the zeal inspired by EUCKEN among his numerous adherents that in 1920 a special "Eucken Association" was founded; a monthly published by this fraternity is entitled „Der Euckenbund, Organ für ethischen Aktivismus."

EUCKEN repeatedly dealt in his writings with the problems of religion and general human culture. In „Der Wahrheitsgehalt der Religion" (1901) and in „Die Hauptprobleme der Religionsphilosophie der Gegenwart" (1907), he recognises in Christianity the highest form of all religion. From his high ideal standpoint, it is true, he expresses doubt as to whether the Christian church can itself contribute to a deepening of religious feeling; indeed, in his brochure „Können wir noch Christen sein?" (1911), he demands the segregation of church and state.

In regard to his cultural studies, interest attaches to his „Geschichte und Kritik der Grundbegriffe der Gegenwart" (1878, reprinted 1904 as „Geistige Strömungen der Gegenwart"), to „Die weltgeschichtliche Bedeutung des deutschen Geistes" (1914), „Die Träger des deutschen Idealismus" (1915), „Deutsche Freiheit, ein Weckruf" (1919), and „Der Sozialismus und seine Lebensgestaltung" (1921), while the history of philosophy is dealt with in „Beiträge zur Geschichte der neueren Philosophie" (1886) and „Die Lebensanschauungen der großen Denker" (1920).

In 1920 EUCKEN also published his own „Lebenserinnerungen."

"The earnest search for truth, the penetrating force of thought and the range of vision, the warmth and strength of delineation, with which in numerous writings he has advocated and developed an idealistic world"—such were the reasons that induced the Swedish Academy to award to him, already in 1908, the Nobel Prize for Literature.

EUCKEN died on September 15th, 1926.

NOBEL PRIZE for 1909

SELMA LAGERLÖF

"It is my express wish that in the distribution of the prizes no regard shall be had to nationality, so that only the worthiest may receive a prize, be he a Scandinavian or not." Thus Alfred NOBEL decreed in his testament.

And thus it appears to us a sign of dignified modesty, that it was only after doing honour to the worthiest representatives of other nations in the conferment of the Nobel Prize for Literature, that the Swedish Academy sought at home for some one worthy of the high distinction. It did not need to seek long. As the President of the Academy declared, "the hour had come for Sweden to come forward in the literary contest and to compete with the great nations." The name which in this connection was mentioned as representing a "star of the first magnitude" was that of Selma LAGERLÖF, in whose writings the Academy recognised the "best and purest traits of our Swedish mother." "To honour her who . . . has touched the best chords in the human breast, and whose name and literary renown have spread far beyond the Swedish borders, means acting in the true spirit of the testator himself." Such were the final words of the President of the Swedish Academy in his address at the distribution of the prizes.

Selma LAGERLÖF was born on November 20th, 1858, on the Marbacka estate in the parish of Östra Emtervik, in Värmland. She came of a family of pastors, members of which had for three centuries been working in Värmland for the spiritual welfare of the population.

At Stockholm Selma attended first a girls' "lyceum" and later a teachers' seminary, after which, for ten years, she held a teacher's appointment at Landscrona. At an early age she first felt the urge to write, and produced some smaller poems, mainly sonnets. Her poetic fancy was most strongly attracted by the "saga" of Gösta Berling, a "forgotten fragment of Swedish country life," intimately connected with her own home-lands; fantastic scenes of this tale occupied her imagination. In 1889 and 1890 she worked out individual chapters, and later sent them as "Ur Gösta Berlings saga" to the periodical "Idun", which had offered a prize for a short story.

She won the prize, which acted as an incentive to her to follow her literary bent. "Gösta Berling" was completed, appearing in Swedish in 1891 and in Danish in the following year. It was followed in 1894 by a volume of short stories, called "Osynliga länkar" ("Invisible Bonds"), and the authoress was accorded encouraging support by King Oscar and, in the form of a scholarship, by the Swedish Academy. Relieved of the necessity to teach, she first undertook a journey through Italy, for the purpose of study, in 1895/96.

If in her "Gösta Berling" she had already dealt naturalism in Swedish literature a mortal blow, and in her subsequent short stories had most happily succeeded in reviving interest in the folklore of her own country, the novel "Antikrists mirakler", compiled as the fruit of her Italian journey and published in 1897, for the first time revealed that regilious mysticism which came forth so pronouncedly in the following "Legends of Christ", dealing at the same time with the problem of the religious sects so prominently active in Sweden. In the same year (1897) the report that religious fanaticism had caused a number of peasants from Dalarne to emigrate to Palestine, encouraged her to depict the experiences of these emigrants in the form of a novel. She visited the Swedish farmers in their new Palestinian home in 1900; the following year saw the appearance of the first volume ("In Dalarne") of her great peasant epos "Jerusalem", depicting the events up to the time of emigration. This was followed in 1902 by the second volume, "In the Holy Land".

The "Kristuslegender" appeared in 1904. Thereupon she again turned to the sagas of her own country and produced the great epic narrative "Liliecronas Hem" (1911), the collection of short stories "Herr Arnes penningar", the "Herrgardssägen", and "The Carter of Death" (all in 1912), and "Homesick Jan" (1914).

Sweden and the Swedish people are impressively depicted in a tale in three volumes, "Nils Holgerssons underbara resa genom Sverige" (1906/07), which was intended to serve as a reader for elementary schools.

Of her latter-day novels "The General's Ring" and "Charlotte Löfvensköld" (both 1925) deserve special mention.

Selma LAGERLÖF'S writings appeared in a collected from in twelve volumes as "Samlade Berättelser" as from 1911. They have been translated into all civilised languages, and have carried the fame of the authoress far beyond the Swedish frontiers. Her growing popularity brought her an increasing number of distinctions, the literary societies of Sweden and Finland being the first to elect her their honorary member; in 1907 the university of Uppsala conferred upon her the degree of doctor of philosophy, in the following year her fiftieth birthday was celebrated throughout Sweden like a national holiday, and again one year later she was awarded the Nobel Prize for Literature by the Swedish Academy, of which body she finally became a member in 1914, the first woman on whom this honour was conferred.

Selma LAGERLÖF, who in 1897 had removed from Landscrona to Falun, the seat of her family, employed part of the fortune accruing to her from the Nobel Prize award for the repurchase of her old paternal estate of Marbacka, which had passed into other hands. Here, as her father and grandfather had done, she farmed her beloved native soil, in which she is so deeply rooted, and which was the cradle of her art and fame.

NOBEL PRIZE for 1910

PAUL VON HEYSE

Paul Johann Ludwig von HEYSE was born in Berlin on March 15th, 1830. His father was Karl Wilhelm Ludwig HEYSE, professor at the university, and his grandfather the grammarian Johann Christian August HEYSE. Paul studied classical philology in Berlin, and Roman philology at Bonn, where he was a pupil of Friedrich DIEZ'S and where he graduated in 1852 with a dissertation on Provençal poetry. Thereupon he travelled in Italy, whence, besides scientific results („Romanische Inedita" from Italian libraries), he brought back a number of poems; these so pleased the Bavarian King, Maximilian II., that in 1854 he invited the young poet to Munich, where, together with Emanuel GEIBEL, who had brought him to the King's notice, he took part in the literary soirées (the so-called „Dichterkreis") of the art-loving monarch.

In his „Jugenderinnerungen und Bekenntnisse" (1900), a valuable source of the history of social and literary life in Munich in the days of Maximilian II., HEYSE furnished a detailed and attractive description of this early period of his career.

Meanwhile HEYSE soon began to make a name as a translator of Romanic poetry, first of all in collaboration with GEIBEL, of the „Spanisches Liederbuch" (1852), which was followed by an „Italienisches Liederbuch" in 1860. These two collections, though born of a mere philologic interest, later became the common artistic property of a universal public, thanks to the compositions based thereon by Hugo WOLF. They were supplemented in the course of time by „Italienische Dichter seit der Mitte des 18. Jahrhunderts, Übersetzungen und Studien" (1889—1905), and by „Italienische Volksmärchen" and „Drei italienische Lustspiele aus der Zeit der Renaissance" (both 1914).

As a writer, particularly of novels, HEYSE evinced extraordinary fertility, unusual wealth of fancy, and a greatly admired agility of style. The total number of his novels far exceeded 100, all of them equally thrilling in their contents, and lively and graceful in their delineation. Most of them appeared in a serial form under various collective titles, covering a period from 1855 until the time of the author's death. We may mention in particular "L'Arrabiata," which was his first short story but a masterpiece he was never destined to excel; furthermore, „Die Einsamen," „Der Weinhüter von Meran," „Andrea Delfin," „Der letzte Kentaur," „Das Glück von Rothenburg," and „Siechentrost."

Among his stories in verse the most important were „Urica" (1852), „Die Braut von Cypern" (1856), „Thekla" (1858), and „Der Salamander" (1879).

In his dramatic efforts HEYSE was rather less successful. The tragedies „Meleager" (1854), „Hadrian" (1865), and „Die Hochzeit auf dem Aventin" (1886) were written in imitation of the classic style, while the dramas „Hans Lange" (1866), and the frequently performed „Colberg" (1868) dealt with national subjects. His biblical drama, „Maria Magdalena" (1899), owed its popularity mainly to the fact that it had at first been banned by the censor. On the other hand, the one-act plays „Ehrenschulden" and „Zwischen Lipp' und Kelchesrand" may be said to have fully deserved the success they attained.

HEYSE retained his creative powers up to an advanced age. His most salient productions were the novels „Kinder der Welt" (1873), „Im Paradiese" (1875), „Merlin" (1892), „Über allen Gipfeln" (1895), „Crone Stäudlin" (1905), and „Die Geburt der Venus" (1909).

HEYSE'S lyrics were full of a sincere tenderness and rich in poetic descriptions and meditations. His volumes of poetry, his „Skizzenbuch" (1877), the „Verse aus Italien" (1880), and his „Wintertagebuch" (1903), may be mentioned as the best of his poetic productions.

HEYSE'S „Gesammelte Werke" appeared from 1871 to 1914 in 38 volumes, a newer edition in 1924 in 15 volumes, his „Dramatische Dichtungen" from 1864 to 1905 in 38 volumes, his exchange of letters with Theodor STORM in 1917/18, and with Gottfried KELLER in 1919. As from 1870 HEYSE collaborated with Hermann KURZ in editing the „Deutscher Novellenschatz" in many small volumes, followed by the „Novellenschatz des Auslandes" and (together with LAISTNER) by the „Neuer deutscher Novellenschatz." He also contributed several translations to BODENSTEDT'S German edition of SHAKESPEARE.

HEYSE was ennobled in 1910. He died at Munich on April 2nd, 1914. He was the first German writer of fiction to receive the Nobel Prize, accorded him by reason of his "perfected and idealistically distinguished art, evinced during a long and meritorious activity as a lyricist, dramatist, novelist, and writer of world-famed short stories."

COUNT MAURICE MAETERLINCK

MAETERLINCK was born at Ghent on August 29th, 1862. When he had barely commenced to practise as a lawyer in his native town, he repaired to Paris in 1887, and there joined the literary circle of VILLIERS DE L'ISLE-ADAM and other leaders of the French symbolistic school. From 1896 on he devoted himself exclusively to literary work.

He first published poems in 1889 under the title of "Serres chaudes," and in the same year his first play, "La princesse Maleine," originally in verse, but later rewritten in prose. This play already showed signs of the "stage-mysticism" so characteristic of his later dramatic works, a novel direction, aiming to inspire fear and enhance nervous tension by means of premonitions and ill omens. This feature was more apparent in his next play, "L'intruse" (1890), where the "intruder" is death, felt approaching by an anxiously assembled family.

"Les Aveugles" (1890) opened the series of MAETERLINCK'S symbolistic plays; it was followed in 1891 by "Les sept princesses." His most successful dramatic creation was perhaps "Pelléas et Mélisande" (1892). The year 1894 saw the production of those quaint and delightful little plays, written for marionettes: "Alladine et Palomides," "Intérieur," and "La Mort de Tintagiles." Under the title of Annabella he published in 1895 a translation of FORD'S "'Tis Pity She's a Whore," to which he wrote a brilliant preface. In 1896 there followed the idyllic and charming "Aglavine et Sélysette."

A new aspect of MAETERLINCK'S dramatic art was apparent in the semi-historical drama, "Monna Vanna" (1902), in "L'Oiseau bleu" (1910), in "Marie Madeleine" (1911), and in a far more recent play, "Le Bourgmestre de Thilmonde" (1921), dealing with the German occupation of Belgium during the war.

In 1895 MAETERLINCK had published an essay on NOVALIS, "Les Disciples à Saïs et Fragments de Novalis;" in the following year he produced a philosophical book, "Le Trésor des humbles." In 1898 he wrote a treatise dealing with the moral fundamentals of mysticism, "La sagesse et la destinée": this furnishes a kind of explanation of his own dramas. Philosophy, nature-study, and fancy are blended in "La vie des abeilles" (1901). Other observations and meditations, again, are collected in "Le temple enseveli" (1902), "Le double jardin" (1904), and "La mort" (1913).

The war and early post-war years were productive of "Des débris de la guerre" (1916), "L'intelligence des fleurs" (1921), "La grande énigme" (1924), and "La vie des termites" (1927).

In the way of lyrical poems he published only "Douze chansons", in 1896.

A collected edition of his plays, the so-called "Théatre de Maurice Maeterlinck," appeared in three volumes in 1904. Nearly all his writings have been translated into English and most of them also into other languages.

Maurice MAETERLINCK was created a Count by the King of Belgium in honour of his 70th birthday (1932). The Nobel Prize was awarded him for his versatile literary gifts, with special reference to his dramatic creations, distinguished by a wealth of fancy and by a poetic idealism which, at times in the veiled form of a legendary play, betrays profound intuition, and mysteriously appeals to the reader's sentiments and premonitions."

NOBEL PRIZE for 1912

GERHART HAUPTMANN

Gerhart HAUPTMANN was born at Obersalzbrunn, a watering place in Prussian Silesia, on November 15th, 1862. Originally intending to become a sculptor, he attended the Breslau college of art, but after a while repaired to Jena University, where he went in for natural sciences. Having published an epic composition entitled „Promethidenlos“ in 1885, he definitely came to the fore as a writer in 1889 with his first drama, „Vor Sonnenaufgang.“ This immediately made him famous, or rather notorious, as the crass naturalism of the play called forth an unprecedented scandal when it was first performed at the „Freie Bühne“ in Berlin.

Under IBSEN'S influence he next wrote the family dramas „Das Friedensfest“ (1890) and „Einsame Menschen“ (1891). A great measure of success was accorded to „Die Weber“ (1892), where the place of the traditional hero is taken by the weavers in a body, while the structure of the play is most naturalistically dissolved into a number of loosely connected scenes. In comparison with this and the following plays, „Kollege Crampton“ (1892) and the satirical thieves' comedy „Der Biberpelz“ (1893), the dream-play „Hanneles Himmelfahrt“ (1894) reaches an apex in the opposite direction, it being just in this glaring contrast between the misery of life and the translucent light of higher spheres that HAUPTMANN'S true greatness as a psychological dramatist is manifest. Following up this pendulum-movement in the choice of his subjects, HAUPTMANN next attempted, in „Florian Geyer“ (1895), to depict the social strife at the time of the Peasant Wars with the same naturalistic means he had employed in his “Weavers,” returning in the following year to an idealistic theme in the symbolic fairy-play, „Die versunkene Glocke.“ The naturalistic dramas of the following years again alternated with symbolic, legendary, and romantic plays: of the former category we may mention „Fuhrmann Henschel“ (1898), „Rose Bernd“ (1903), and „Die Ratten“ (1911); of the latter „Der arme Heinrich“ (1902) and „Und Pippa tanzt“ (1906), the last-named being an elaboration of BROWNING'S “Pippa Passes.”

Among his later plays, „Die schwarze Maske“ and „Hexenritt“ (1929, published together under the title of „Spuk“) are fantastic nocturnos, depicting life as a game played by gruesome powers and mystic beings, and governed in a way thoroughly characteristic of HAUPTMANN by the devilry of instincts. His last historic drama, „Kaiser Karls Geisel,“ unfolds the tragedy of an ageing man smitten with love for a heartless wench; by many it was thought to detract too rudely from the veneration until recently still felt in Germany for a historic figure such as Charlemangne's. On the occasion of HAUPTMANN'S 70th birthday, his collected plays, „Das dramatische Werk,“ appeared in a new six-volume edition.

As a novelist HAUPTMANN betrays similar contrasts, the naturalistic short stories of his youth, such as „Bahnwächter Thiel,“ were offset at a later date by his great fantastic novels, „Der Narr in Christo“ (1910), „Phantom“ (1922), and „Die Insel der großen Mutter“ (1924), while „Atlantis“ (1912), inspired by the Titanic disaster, combines fancy and naturalism. In a poetic tale in prose, „Der Ketzer von Soana“ (1918), he undoubtedly attained his zenith. His latest novel, „Buch der Leidenschaften“ (1929), is very greatly autobiographic.

In 1891 HAUPTMANN went to live at Schreiberhau, a small mountain village in Silesia; he now lives at Agnetendorf in the Riesengebirge.

The reasons cited as entailing the Nobel Prize award made special mention of HAUPTMANN'S soul-searching perspicacity, the sincerity of his descriptions of nature, the concentrated artistic force of his delineation, his finely developed artistic sense, and his personal nobility of character. We might well add to these merits his virtuosity in the description of background, his warmth of feeling, and the absolute purity of artistic treatment which makes HAUPTMANN one of the most genuine exponents of modern fiction.

The Nobel Prize was awarded him “in particular for his activity in the realm of the modern drama.”

RABINDRANATH TAGORE

Sir Rabindranath TAGORE was born at Calcutta on May 6th, 1861; he was the son of Maharshi Devendranath TAGORE and came of highly respected Brahmin stock, the family having in the course of centuries produced various eminent Hindu philosophers and artists. The name Tagore (or "Thakur," as it was in Bengalese) means "master," while Rabindranath may be translated "prince of the sun."

The boy lost his mother at an early age, and his father was frequently absent on journeys; thus Rabindranath grew up in solitude, a fact which inclined him to commune with nature and fostered his poetic instincts. His boyhood and youth, spent mainly on his father's estates, brought him into constant touch with the forests and jungles, though he was given a very good, modern education; in 1877 he was sent to England, where it was intended he should study law, but the poetic urge was so strong within him that this idea was abandoned, and he returned to India one year later.

TAGORE'S first poems were imitations of two older Bengalese poets, CHAUDIDAS and VIDYAPATI, but very soon a poetic vein of his own became apparent in the "Bhânu Sings" ("Eveing and Morning Songs"), which he published in 1879. The musical trend in his family circle, frequently manifested in amateur concerts and dramatic-musical performances, encouraged him to occupy himself zealously with music, which he both studied and practised, acquiring some renown as a singer. It was thus quite a matter of course for him to compose a musical accompaniment to his poetic productions.

After these subjective lyrics to which his earlier years were devoted he began to write descriptive prose studies. Entrusted, in 1884, with the administration of the family property, he settled at Shelida on the Ganges, where, in close contact with the colourful native life around him, he compiled his "Short Stories." His plays, "Chitra," "The Post-Office," and "King and Queen," likewise date from this period, as does also the collection of sincere and tender lovesongs, later known under the title of "The Gardener". Much interest, also beyond the borders of his native country, was aroused by his English translation of the "Gîtanjalî", a collection of solemn hymns; compiled between 1907 and 1910, it first appeared in 1912. A further gleaning of lovesongs in continuation of "The Gardener" was published as "The Fruit Harvest". "The Waxing Moon" was the title of a volume of juvenile songs, "Birds of Passage" that of a collection of poetic sketches. His novel, "The Home and the World", proved a great success.

In the year 1905 TAGORE lost his wife, soon afterwards his daughter, and again a few months later his son. The death of his dear ones tended to deepen the religious traits in his poetry.

Over and above his mission as a poet, TAGORE felt the intense urge to act as a teacher and leader of his people. Near the town of Bolpur in Bengal, on a spot consecrated by the pious life of his father, he established a college which was completed in 1912 and which he called "Shantiniketan", i. e. "Home of Peace". Its object was to prepare the way for a new and happier era in his home-country by giving the people a more soulful and sincere conduct of life.

In 1912, mainly for the sake of his impaired health, TAGORE repaired to England, and in the following winter visited America, where he delivered a number of lectures, subsequently published under the collective titles of "Personality" and "Nationalism". His ethically most profound effort in this direction was the book "Sadhana, the Way to a Realisation of Life".

Returning to India, he set himself energetically to develop his newly-founded college, for which, on the occasion of another visit to Europe in 1921, he recruited foreign scientists and artists.

The foundations of TAGORE'S writings are of a religious-philosophic nature, a manifestation alike of his piety and his love of the world. They find most eloquent utterance in a collection of addresses, to which he gave the name of his college, "Shantiniketan."

TAGORE is by no means an ascetic: he does not deny the claims of the world, but he turns in horror from the egotism of metropolitan culture, from the unworthy superficiality and shallowness of the modern type of men and women, and seeks to impart a higher sense to life, and to point the way to a deeper internal realisation.

His compositions were at first written in the Bengalese idiom, but when an early translation of some of his poems into English met with marked success, he was induced to rewrite in that language the bulk of what he had produced.

From among his numerous latter-day poems and stories we may select the second series of "Gîtanjalî" as deserving special mention, as also the narrative called "The Night of Consummation", and the ingenious dramatic works, "The Hermit" and "The King of the Dark Chamber."

The year 1917 saw the publication of the autobiographic book "My Reminiscences".

The Nobel Prize was awarded TAGORE "for his profound, noble, fresh and beautiful poetry, which in its English rendering has happily secured him an honourable place in western literature".

Rabindranath TAGORE was knighted in 1915.

ROMAIN ROLLAND

Romain ROLLAND, a notary's son, was born on January 29th, 1866, at the little Burgundian town of Clamecy, Nièvre. He studied in Paris, mainly history, became member of the "École française" in Rome, and in 1895 took his degree as "docteur ès-lettres." He thereupon for five years taught history at the "École normale supérieure", and was later on for nine years professor of the history of music at the Paris "Faculté des lettres", a department of the Sorbonne. The outbreak of the world war found him in Switzerland, where he devoted his services to the Red Cross, and did his utmost under adverse circumstances in the interests of an ultimate reconciliation of the nations. In this effort he was aided by his exalted idealism, which had also gained him much appreciative admiration in Germany, and which paved the way for a new spiritual fraternisation between the French and the German peoples. Since 1914 ROLLAND has lived permanently in Switzerland, first of all at Geneva, and latterly at Villeneuve near Montreux.

ROLLAND began to write as a musical critic, in which respect importance already attached to his graduation thesis on the "Histoire de l'opéra en Europe avant Lully et Scarlatti" (1895), which gained a prize from the Académie française. It was followed, *inter alia*, by his "Musiciens d'autrefois" and "Musiciens d'aujourdhui" (both published in 1908), by his great biography of Händel (1910), by the "Voyage musical au pays du passé" (1919), and by "Beethoven, l'homme et l'art" (1922).

Finally he published "Beethoven, les grandes époques créatrices," the first volume of which ("De l'Héroique et l'Appassionata") appeared in 1929, and an "Essai sur Goethe et Beethoven."

Far in excess of a mere scientific delineation, he succeeded, in three "heroic" biographies, in demonstrating the greatness of certain artists as reflected in their humanity; the biographies in question were his "Vie de Beethoven" (1903), "Vie de Michel-Ange" (1906), and "Vie de Tolstoi" (1911).

ROLLAND'S prominence, meanwhile, is principally due to his own creative achievements, in the first place in the realm of the drama, in which respect, however, his works have so far only been published in part.

When ROLLAND removed from his Burgundian home-town to Paris, he did not fall a victim to the temptations of the metropolis, adapt himself to its morals, or lose his personality under its levelling influence; imbued as he was with the spirit of Shakespeare, he could not but realise the emptiness and corruption of the boulevard stage when measured by such a criterion. Like Tolstoi, ROLLAND was fully convinced that art was meant to bring relief to suffering humanity; in this spirit he long advocated the idea of a "théatre du peuple". But such a new theatre called for a new form of art. ROLLAND sought it in vain in the literature of the contemporary world; nor did he succeed in finding the sympathy of the people, without which so great an idea could never be realised. In the face of disappointments such as these he wrote his own plays. The first to be published were his "Tragédies de la foi", created in an age which mocked faith as narrow-minded and old-fashioned: the dramatic legend of "Saint Louis" (1897), who died on a crusade, and the drama of his prince "Aërt" (1898). Under the title of "Théatre de la révolution", he started a cycle intended to comprise a dozen plays; seven of these have been published and performed; viz., "Pâques-Fleuries" (the prologue, 1927), "Le quatorze juillet" (1902), "Les loups" (1898), "Le triomphe de la raison" (1899), "Danton" (1900), "Le jeu de l'amour et de la mort" (1924), and "Les Léonides" (the epilogue, 1928). All these plays were inspired by tragic conflicts born of conflicting ideas. Under the impression of the unjust Boer War, he produced the drama, "Le temps viendra" (1903); here again the idea is of greater importance than reality. The symbolical burlesque, "Liluli" (1918), refers to the World War. These plays (here listed in their sequence of production rather than in that of their publication) are, meanwhile, by no means the sum total of his dramatic creations.

ROLLAND'S greatest international fame, however, rests on his novels, if so hackneyed a generic term may be applied to books which, far from serving for the entertainment of the superficial reader, reflect the experience and philoslophy of one who goes to the very depths of life and of the human soul, and seeks to raise the problems of an every-day world to a nobler level.

His most famous story, "Jean Christophe", first appeared serially from 1904 to 1912 in the "Cahiers de la Quinzaine," the fortnightly review published by Charles PÉGUY. It became known and admired throughout the world, being translated, concurrently, into Spanish (as from 1907), English, Polish, and Russian (as from 1910), and German (in 1913). In the form of the life-story of the German musician, Johann Christoph, modelled on the elemetary creative power of Beethoven, ROLLAND depicts the struggles of a creative genius with himself and his age, pursuing the fortunes of his hero from the deepest misery to the joy of productive work, a development in which, through constant strife and suffering, a mastermind acquires a new outlook on life. At the same time, it is the struggle of a new generation against old prejudices, the protest of a divinely gifted artist against his pettifogging epoch, that imparts to the tale a veiledly autobiographic charm, for ROLLAND'S own mission in life was faced with equal difficulties. Starting in a small German town, the story conducts us to the French metropolis and through all the western world; the contrast among the three great nations of the western Continent, the Germans, the French, and the Italians, with the essential elements of their existence, finally culminates in the passionate appeal to all of them to unite in the interests of joint cultural work.

ROLLAND himself had suffered bitterly under the pessimistic outlook of the waning epoch with its natural-scientific manner of thought, which looked upon all happenings, including the creative forces of the mind, as the outcome of a natural casualism. Life was stripped of its gods, every nobler effort bereft of its sense, metaphysics practically abolished. Under ROLLAND'S influence France may be said to have got the better of this scepticism, rationalism, and unnerving pessimism, and to have experienced a renovation of sentiment which alone renders him worthy of the Nobel Prize in the spirit of the testator. In addition, however, ROLLAND has, in a number of other idealistic writings, championed and ultimately put through the triumph of human volition, the victorious confidence in human strength, the fight against evil instincts, the conquest of blatant epicureanism, and the vindication of human virtues long considered antiquated and ridiculous, in short, a rebirth of spiritual life.

The novel, "Pierre et Luce" (1920), is a tale of the tender love of two young souls amid the trials and turmoils of war. Another book written under the stress of warfare (1916—1919) was "Clerambault" (published in 1920). It likewise depicts the struggle of an individual for truth and honesty against the despotic opinions of the masses; like ROLLAND'S "Beethoven" and "Jean Christophe," the poet Clerambault wins through to final triumph.

The problematic fetters governing these stories ROLLAND managed to cast off in "Colas Breugnon", a tale written in a far happier vein. Written immediately after "Jean Cristophe", it was designated by the author as a "cheerful tale", being the humorous story of a poor woodcarver from ROLLAND'S home-country of Burgundy, a being unencumbered by problems or politics.

1922 saw the beginning of the great series of novels called "L'Âme enchantée," the enchanted soul being that of a woman victimised by the egotism of her husband; this is one of the writer's most colourful books and at the same time one full of human tenderness.

ROLLAND'S works have been written "pour toutes les âmes libres du monde entier," as he expressly states in his dedication to "Jean Christophe", and they have found a grateful public in all the world, not only in Europe, but in America, China, Japan, and India. Everywhere, ROLLAND'S ideas have met with enthusiastic response.

In French official circles and in the French press, meanwhile, his utterances (in certain passages, as e. g. in the "fair-ground scene" in "Jean Christophe" and in a number of political articles published in 1915 as "Au dessus de la melée") earned him bitter enmity. While in the said passage of his novel he had declared war on the Paris "bosses" of the day, and unsparingly criticised the false, mendacious France of the parasites, the articles referred to were directed against the orgy of chauvinism during the war. But the great French public has faithfully followed him through three decades; the France he shows to the world is the serious, hard-working France that longs for lasting peace and for European understanding. What characterises ROLLAND quite particulary in the eyes of the broad public of all countries was his attitude during the war, and his authorship of articles such as those mentioned above, articles which, ever since, have exposed him to storms of abuse from nationalist circles. They appeared in a collected form in the said book, "Au dessus de la melée"

(1915), and in “Les précurseurs“ (1918). The satirical comedy, “Liluli“ (1918), and the novel, “Clerambault”, are likewise eloquent attacks on the idols of modern nationalism.

Since the end of the war ROLLAND has perhaps aroused most attention internationally by his book on “Mahatma Gandhi” (1923) and his advocacy of closer mental contact between east and west. This is the aim he set himself in a series of books, viz. “Mahatma Gandhi”, “Vie de Ramakrishna,” “Vie de Vive kananda,” and “L’Evangeli universel,” which last-named compares Christianity with Brahminism. The three sequels to “Mahatma Gandhi” were published simultaneously in 1930 under the title “Essai sur la mystique et l’action de l’Inde vivante.”

Two years after being awarded the great prize for literature of the Académie française, ROLLAND was selected for the Literary Nobel Prize, the award making special mention of “the noble idealism of his literary activity”, and “the faithful and abundant characterisation of mankind, giving evidence of great depth of sentiment”.

VERNER VON HEIDENSTAM

Verner von HEIDENSTAM was born at Olshammar, Örebro, Sweden, on July 6th, 1859. By reason of poor health he was obliged to stop his studies in favour of a lengthy sojourn in the south, followed by a long voyage to the Orient. In 1881 he became a pupil of the Ecole des beaux-arts in Paris, but soon resumed his wanderings through Italy, Switzerland, and Germany, reaching Sweden again in 1887. Here, in the following year, he published his first poetic work, a collection of poems called "Vallfart och vandringsår".

Subsequently he undertook further journeys, to the Balkans, Russia, Greece, Spain, Holland, and England. Since 1903 he has resided mainly in Sweden.

In a number of polemic writings HEIDENSTAM opposed the "foul-weather mood" of the naturalist style, on which he inflicted a serious blow by his first volume of poems referred to above. The idealistic direction of his poetry, its wealth of flowering fancy, and the southern gorgeousness of his descriptions were obviously in direct opposition to the dull sobriety of the realistic school prevailing in Sweden in the eighties of the last century.

His first big prose work, the novel "Endymion" (1889), was followed by the epic composition, "Hans Alienus" (1892), in which, partly in prose and partly in verse, he conducts his hero, a homeless seeker after beauty, through successive ages. He attained monumental grandeur in his national-historic novel, "Karolinerna" (2 vols., 1897/98), recounting the fortunes of Charles XII. and his warriors; two shorter stories were called "Sankt Göran och Draken" (1900) and "Den heliga Brigittas pilgrimsfard (1901). A two-volume historical novel, "Folkungaträdet" (1905/1907), deals with the heroic events of the early Christian era in Sweden. "Svenskarna och deras hövdingar" (1908/10) is a historical reader for schoolchildren.

Æsthetic questions and problems of culture in general are dealt with in two collections of miscellanies, "Tankar och techningar" (Thoughts and Pictures", 1899) and "Dagar och Händelser" ("Days and Events", 1909). He published travel reminiscences under the titel "Från Col di Tenda till Blocksberg" (1888).

HEIDENSTAM'S exalted conception of life is expressed most clearly and purely in his poems. Twenty years after his first publication of "Dikter" (1895), there appeared his "Nya Dikter" (1915), meditative and beautiful verses which placed him in the first rank of Swedish lyric poets.

The award of the Nobel Prize was in "recognition of his importance as the exponent of a new epoch in our fine arts".

KARL GJELLERUP

Karl Adolph GJELLERUP was born June 2nd, 1857, at Roholte, in the Danish island of Sealand. The son of a pastor, he studied theology at Copenhagen, but early began to try his hand at writing, especially in the form of dramatic verse. At the university he contacted with the radical, "enlightening" democrats grouped around G. BRANDES and including such men as DRACHMANN and J. B. JACOBSEN. Under the influence of this circle, he wrote his first novels, among them "An Idealist" (1878), "Young Denmark" (1879), and "Antigonus" (1880).

Having come into some money, he travelled through Germany, Switzerland, Italy, Greece, and Russia, during which journeys he became more and more estranged from his Copenhagen associates, by whom his aristocratic nature had all along felt slightly repelled: in his book "Vandreaaret," describing his tour (1884), the breach became wholly apparent. GJELLERUP had discovered his independent line of thought, his outlook on life developing gradually into a pessimistic avowal of the prime necessity of self-conquest and self-salvation in the sense of Buddhist teaching and the philosophy of SCHOPENHAUER and KANT.

His first independent dramas were the lyrical tragedy "Brynhild" (1884), the revolutionary drama "Saint Just", written at Dresden (1886), "Thamyris" (1886), "Hagbart og Signe" (1888), and the two comedies "Herman Vandel" and "Wuthorn" (1891). At Dresden he was attracted by the operas of Richard WAGNER, on whose "Ring des Nibelungen" he wrote a treatise, at the same time translating the "Songs of the Gods" from the "Edda". In 1892 he took up his permanent abode at Dresden. In later years he wrote some additional plays in German, in particular „Die Opferfeuer" (1903) and „Das Weib des Vollendeten" (1907), both of which were repeatedly performed on the German stage.

The literary form, however, in which GJELLERUP did his best work was the novel. His first tale, "Minna" (1889), was still written in Danish, but his second, "Pastor Mores" (1894), was already in

German, in which he thenceforth continued to write exclusively. There followed the novel „Die Hügelmühle“ (1896) and, rather later, a number of stories of Buddhist India, viz. „Der Pilger Kamanita“ (1906), „Die Weltwanderer“ (1910), „Der Ruf für das Leben“ (1916), „Die Gottesfreundin“ (1918), and lastly the fantastic tale, „Das heiligste Tier“ (1920).

A cycle of short stories, „Der goldene Zweig“ (1917), deals with the influence of Christ on the contemporary world.

A volume of collected lyrics in Danish, „Min Kjaerligheds bog”, had appeared as early as 1889.

The Nobel Prize was awarded GJELLERUP “for his copious, versatile, and idealistic fiction”.

He died at Klotzsche near Dresden on October 11th, 1919.

An account of his life and work appeared in two volumes (1921—1923) under the title “Karl GJELLERUP, the Poet and Thinker. His Life, as Portrayed by Himself.”

NOBEL PRIZE for 1917

HENRIK PONTOPPIDAN

Like Karl GJELLERUP, with whom he was to share the Nobel Prize, Henrik PONTOPPIDAN was the son of a Danish pastor, and came of a family that had produced two noted theological writers in earlier centuries. Born at Fredericia in Jutland on July 24th, 1857, Henrik studied at the Copenhagen Polytechnic, and subsequently saw a good deal of the world in the course of more or less adventurous wanderings, before finally settling down to a literary vocation.

His first essays were descriptions of nature and popular life, but later on it was the struggles of the human soul and man's yearning for perfection that principally characterised his tales and novels, masterpieces of exact observation. Collections of short stories, chief among them "Stœkkede Vinger," and novels, such as "Mimoser" (1886, translated into English as "The Apothecary's Daughters"), were followed by his great trilogy: "Muld" (1891), "Det forjættede Land" (1892), and "Dommensdag" (1895), as also by "Den gamle Adam" (1894), and two very long tales, published in successive sequels: "Lykke Per" (in 8 volumes, 1898—1904) and "De Dödes Rige" (1912—16, partly rewritten in 1917); in the last-named book the author dealt critically with numerous problems of the early 20th century.

While these greater novels together made up a picture of the Denmark of his day and of a civilisation rent by social, religious, and political struggles, various of his shorter tales brought his own personality more to the fore; of these we may mention "Ung Elskov," "Minder," "Borgmester Hœck og hans Hustru," and "Den kongelige Gæst," which were published, together with other stories, in two volumes of "Noveller og Skitser." Of his other novels, "Höisang," "Det ideale Hjem," and "Lille Rödhætte" deserve to be named. Many of his books have been read and appreciated in England and America.

PONTOPPIDAN was awarded the Nobel Prize "for his valuable description of present-day life in Denmark."

NOBEL PRIZE for 1919

CARL SPITTELER

Carl SPITTELER was born on April 24th, 1845, at Liestal in the Baselland canton of Switzerland. He studied first law at Bâle and then theology at Zurich, Heidelberg, and Bâle, after which he was for seven years in Russia as a tutor, returning to Switzerland in 1881. After teaching for a while at public schools, he edited a newspaper at Bâle and subsequently another at Zurich, but eventually abandoned journalism for an independent literary career, in which connection he settled at Lucerne in 1892.

While in Russia and Finland he had written a great epos in prose, „Prometheus und Epimetheus,“ which he had printed at his own expense upon his return to Switzerland, employing the pen-name of Carl Felix TANDEM. It met with no success. Later on SPITTELER rewrote it in verse, in which form it appeared in 1924 under the name of „Prometheus der Dulder.“

His subsequent writings prior to 1900 were “Extramundana” (1883); a volume of poetry, called „Schmetterlinge“ (1889); two novels, „Friedli der Kolderi“ (1891) and „Gustav“ (1892); „Literarische Gleichnisse“ (1892); „Balladen“ (1896); a descriptive novel, „Der Gotthard“ (1897); „Conrad der Leutnant,“ a tale distinguished by great psychological depth of sentiment (1898); and a collection of delightful essays, „Lachende Wahrheiten“ (1898).

SPITTELER'S greatest work, „Der Olympische Frühling,“ a philosophic-mythological epos, appeared serially in four volumes from 1900 to 1905; despite considerable literary value, it met with little success until the prominent musician, Felix WEINGARTNER, drew the attention of German readers to the author's merits by an article entitled „Carl Spitteler, ein künstlerisches Erlebnis,“ (Munich, 1904). In 1910 a revised edition of this epos appeared in five parts. It was to „Der Olympische Frühling“ that SPITTELER mainly owed the award of the Nobel Prize.

His next productions were the „Glockenlieder“ (1906), a collection of epic studies in a lyric style, the psychological novel, „Imago“ (1906), „Gerold und Hansli,“ a story for children (1907), and „Die

Mädchenfeinde“ (1907). Juvenile reminiscences were contained in „Meine frühesten Erlebnisse“ (1914).

During the World War SPITTELER observed an attitude of the strictest neutrality, to which he gave expression in a small publication, „Unser Schweizer Standpunkt“ (1915).

He died at Lucerne on December 28th, 1924.

NOBEL PRIZE for 1920

KNUT HAMSUN

Knut PEDERSEN (this being the novelist's real name) was born at Lom (Vaagaa) in Gudbrandsdal, Norway, on August 4th, 1859. He came of peasant stock, and was reared in the wild solitudes of the Scandinavian north. As a writer he elected to use the name of HAMSUN in lieu of PEDERSEN. He described his poor and joyless youth under the title of "Oplevelser" ("Experiences") in an article published in the "Nordisk Familjen-Journal" in 1898.

HAMSUN had no regular schooling, though he acquired a certain education in the house of an uncle, a rural preacher. At the age of seventeen he was apprenticed to a shœmaker at Bodö, a little fishing-village, but, a youth of powerful build, he soon gave up this work in favour of a coal-trimmer's job, and thereupon for many years roamed the length and breadth of Norway, earning a precarious living as a navvy, a woodman, and a stevedore. In the middle of the eighties, he twice shipped as a stoker on board steamers bound for America, where he likewise lived a roving life of various occupations, working as a farm-hand in the prairies, as a tram-conductor in Chicago, as a sleeping-car attendant on a trans-American railroad, and as a performer at Minneapolis. For three years, on the occasion of his second American sojourn, he was engaged in fishing, with eight companions, cut off from the world on the lonely shores of Newfoundland. Subsequent wanderings took him to Paris, to Russia, and to the Caucasus. All the while he was working hard for a living, but at the same time he was gaining an insight into life such as few others have gained. And, while rubbing shoulders with all the world, he remained lonely, a recluse and a dreamer.

In 1886 a Danish periodical published a fragmentary story from his pen, entitled "Sult" („Hunger"); when, four years later, it appeared in book-form, it immediately gained him a place in the forefront of Scandinavian authors. At an earlier date, he had produced a play, "Et Gjensyn" ("An Encounter," 1877) and the novel "Björger" (1878), both showing the influence of BJÖRNSON'S peasant stories. In two polemic writings, "Fra Amerikas Aandsliv" (1889) and "Lars Oftedal," on the other hand, he first betrayed a talent for intelligent sarcasm. Though in the next few years HAMSUN'S public lectures were directed theoretically against the naturalistic trend in the literature of his native land, his novels written in the early nineties, "Mysterier" (1892), "Redaktör Lynge" (1893), and "Ny Jord" ("New Soil," 1893), were themselves essentially naturalistic, though not devoid of a pronounced psychological vein. In this respect his next novel, "Pan" (1894), marks a turning-point and at the same time an apex in his literary work, for the first time revealing his mystic attachment to nature as manifested in the untouched northern wildernesses and his subjective attitude towards outward happenings. After a single deviation in the touching and tender love-story "Viktoria" (1898), which is in a class by itself, a long series of subsequent novels of the same soil-born type ensued in the course of time: "Svaermer" (1904), "Under Höstsjernen" (1906), "Benoni" (1907), "Rosa" (1908), "En Vandred Spiller med Sordin" (1909), "Den Sidste Glaede" (1911), "Börn av Tiden" (1913), "Segelforsby" (1915), and his outstanding masterpiece "Markens Gröde" ("Boon of the Soil," 1919). It was this monumental achievement, descriptive of life in the new settlements in the far north, that may be said to have earned HAMSUN the Nobel Prize for Literature. It was followed by "Konerne ved Vandposten" (1920), and by the two-volume novel "Sidste Kapitel," (1925), also representing the writer at his best. In 1927 "Tramps" appeared as first of a trilogy of novels recounting the destinies of a navigator who finds his way back to his humble native harbour; the story was continued in "Augustus, the Navigator" (1930) and "In a Year and a Day" (1934). And thus the long line of HAMSUN'S powerful and penetrating pictures of life brings us to his latest book, "Ringen sluttet" ("The Circle Closes," 1936).

Untiringly, HAMSUN has produced novel after novel, all of them imbued with the charm of his uniquely attractive personality: in each we see a stout-hearted man face to face with omnipotent nature, with which HAMSUN has always been in closest touch and which awakens a host of echoes in his soul.

In the dramatic field HAMSUN has likewise produced some remarkable works, the early attempt to which we have already referred being followed, albeit considerably later, by a trilogy: "Ved Rigets Port" (1895), "Livets spil" (1896), and "Aftenröde" (1898). The year 1902 gave birth to a romantic drama in verse, "Munken Vendt," a very bold glorification of intellectual vagrancy, stoic self-assertion, and voluntary self-destruction. In the following year he wrote a legendary drama, "Dronning Tamara," which, like the collection of verses "I Aeventyrland," was the outcome of his visit to the Orient in 1903.

Apart from various collections of short stories and sketches, such as "Stridende Liv" ("Conflicting Life"), HAMSUN'S collected works down to 1918 were published in twelve volumes in that year ("Samlade Berättelser"), while a selection of his poems ("Dikte") appeared in 1921.

HAMSUN soon employed the proceeds of his literary activity for the purchase of a farm in the south of Norway, so that his time was thenceforth divided between writing and tilling the soil in which he was so intimately rooted.

Conservative as he was in the love of his native soil, it is not surprising that he should have vehemently opposed the attempts that were made in the early years of Norwegian indepedence to introduce a new orthography; his polemic articles in this connection appeared in a collected form in 1917 as "Sproget i Fare" ("The Language in Danger").

HAMSUN lives at Grimstad in Norway.

ANATOLE FRANCE

Jacques Anatole THIBAULT, as this writer was actually called, was born in Paris on April 16th, 1844. The pseudonym of FRANCE was one which had already been employed by his father, a bookseller by trade, who had occasionally come forward as a writer. Anatole studied in Paris and became a librarian in 1874, but was subsequently obliged to quit his post by reason of differences between him and his superior, the writer Leconte de LISIE; he thenceforth devoted himself exclusively to literary work.

After publishing some poetry, "Poèmes dorés" (1873) and "Noces corinthiennes" (1876), and a few shorter tales, "Les désirs de Jean Servien," (not printed until 1882) and "Jocaste et le chat maigre" (1879), he made his first great and decided hit with the novel "Le crime de Sylvestre Bonnard" (1881), which earned him a prize at the hands of the Academy.

Compared with the sober, workaday poetry of ZOLA and the French naturalists, whom FRANCE also attacked in criticisms, his own verses and tales marked the advent of a new rule of fancy, a choice of worthy, exalting subjects, and a deepening of psychological sentiment, added to which the young author possessed a brilliant style. His legend "Balthasar" (1889) was followed by "Thais" (1890), the story of a saint, by "La Rôtisserie de la Reine Pédauque" (1893), which is undoubtedly one of his masterpieces, and by its continuation, "Les opinions de Jérôme Coignard" (1893).

"Le lys rouge" (1894) dealt with the morals of the day. In his "Histoire contemporaine" FRANCE brought forth four important novels, viz., "L'orme de mail," "Le mannequin d'osier," "L'anneau d'améthyste," and "Monsieur Bergeret à Paris" (1897 till 1900), in which he furnished a brilliant satyrical picture of morals and society in the Third Republic.

Among the numerous novels and historical tales which next ensued, special importance attaches to "L'ile des pingouins" (1908), in which the entire history of France is ironised, and to "Les dieux ont soif," (1910), dealing with the period of the first French revolution.

It is on these novels that Anatole FRANCE'S fame as an author particularly rests. The exalted level of his art, meanwhile, was no less apparent in his shorter stories, of which, in addition to those already named, we may mention "L'etui de nacre" (1892), "Crainquebille" (1902), "Les puits de Sainte-Claire" (1895), and "Les sept femmes de Barbe-Bleu" (1909).

"Le livre de mon ami" (1885) and its continuation, "Pierre Nozière" (1899) are of autobiographical value, as are also "Le petit Pierre" (1918) and "La vie en fleur" (1922).

Some critical studies were collected in the four-volume work, "La vie littéraire" (1888—1892); a similar collection of essays subsequently appeared in two volumes as "Opinions sociales" (1902). His "Vie de Jeanne d'Arc" (2 vols., 1908) was a historical work of some importance.

The award of the Nobel Prize for Literature was in "recognition of his brilliant work as a writer, characterised by an exalted style, generous humanity and beauty, and bearing the stamp of true French ésprit."

His masterly control of style, his brilliant scepticism, and his great kindliness and sympathy earned him the appreciation of all his contemporaries. Most of his works have been translated into various foreign languages.

Anatole FRANCE died in the vicinity of Tours on October 13th, 1924.

JACINTO BENAVENTE

Jacinto BENAVENTE was born in Madrid on August 12th, 1866. He was the son of Mariano BENAVENTE, an eminent physician to whose memory a statue was erected in the Buen Retiro Park in Madrid. Originally intended for a legal career, Jacinto felt irresistibly drawn to poetry and the drama, and when, in 1865, his father died, leaving him a handsome fortune, he abandoned his legal studies. After travelling extensively in Russia, France, and England, he was eager to commence journalistic work upon his return. In 1893 he published his first volume of poetry, and also attained signal success by a collection of prose sketches under the title of "Cartas de Mujeres," of which a second series appeared in 1902.

This initial success, however, has been far surpassed by BENAVENTE'S dramatic works, particularly by his numerous satirical plays; most of these are realistic images of society life, while others are of a rather symbolical nature. They have made his name known far beyond the frontiers of his native country.

Starting in 1892 with the "Teatro fantastico," he was eminently successful with his second play, a comedy called "El nido ajeno." It was in the satirical drama, "Gente conocida" (1896), that he began to scourge with pitiless irony the corrupt society of Madrid. This was the first of a series of social-satirical comedies, representing a Spanish counterpart of the plays of Bernard SHAW, though without any spiritual dependence on either part. Chief among these plays were "El marido de la Tellez" (1897), "Mas fuerte que el amor" (1906), and "La losa de los suenos" (1911).

Various other plays, such as "Senora ama" (1908) and "La malquerida" (1913), deal with Castilian peasant life.

A quite particular vein of humour is apparent in BENAVENTE'S brilliant harlequinades, comedies combining worldly wisdom and satire in the form of a fantastic symbolism. Of these we may mention "La noche del Sabado" (1903), "La escuela de princesas" (1909), "Los intereses creados" (1907) and its continuation, "La cuidad alegre y confiada" (1916).

All BENAVENTE'S plays are characterised by brilliant style, acutely pointed dialogue, and a powerful, exalted sentiment. He is unsurpassed in his humorous, sketchy one-act comedies.

BENAVENTE has translated several classic and modern plays of international literature into Spanish. In 1909 he founded a theatre for children, but, though he wrote several plays for it himself, it was not destined to exist for long. Occasionally he also appeared as an actor on the stage in personification of one or other of his characters.

In 1922/23 he went on a theatrical lecturing tour through the Spanish countries of America.

Both in his native land, where he is extremely popular, and in the other Spanish-speaking countries, he is recognised as the greatest living exponent of the Spanish drama, the glorious traditions of which he was so eminently instrumental in restoring. It was in recognition of this fact that he was awarded the Nobel Prize for Literature in 1922.

WILLIAM BUTLER YEATS

William B. YEATS was born at Sandymount, near Dublin, on June 13th, 1865. He was the son of the lawyer and portrait-painter, J. B. YEATS. Though educated partly in Dublin and partly in London the boy regularly passed the summer months in Sligo Country, where his mother's family had an estate. Here it was that he acquired that love of the hills and lakes of Ireland and that predilection for Irish native poetry which are both so apparent in all his writings.

1887 saw the appearance of his first book of verse, "The Wanderings of Oisin." YEATS was accepted into literary circles in London, and participated in the foundation of various societies for promoting the study of Irish literature in English, *inter alia* of the "Rhymer's Club." Together with Edwin J. ELLIS he edited William BLAKE'S works in 1893, and, two years later, "A book of Irish Verse" on his own account.

In 1892 he produced his first play, "The Countess Cathleen," which was followed, in 1894, by the successful one-act play, "The Land of Heart's Desire." Meanwhile the first volume of his essays had appeared (1893) under the title of "The Celtic Twilight."

In 1897, which year gave birth to a short romance, "The Secret Rose," and to two other poems, "The Tables of the Law," and "The Adoration of the Magi," YEATS commenced his efforts for the creation of an Irish theatre; in collaboration with Lady GREGORY, Edward MARTYN, and other like-minded friends, he worked zealously for the realisation of this plan, and already in 1899 succeeded in founding the Irish Literary Theatre in Dublin. During the first three years of its existence, it is true, plays were performed there at considerable intervals and only in English, but, as from 1902, there were regular performances by a troop of Irish amateur players, who in the course of time developed into a veritable theatrical company, so that in 1904 YEATS was in a position to open the Abbey Theatre. It was not only by his own plays that he was subsequently able to raise this theatre to a high level; he recruited the aid of other authors, such as George MOORE, also launching several Irish dramatists who had been formerly unknown, including John SYNGE and Padraic COLUM. It was in connection with his theatre that he wrote various literary and critical essays, e. g. "Ideas of Good and Evil" (1903) and "Plays and Controversies" (1923).

YEATS'S own plays treat mainly of ancient Irish stories and traditions. Among the most successful were the three prose dramas, "Cathleen in Houlihan" (1902), "The Pot of Broth" (1902), and the Hour-Glass" (1903), as also "The King's Threshold" (1904), "On Baile's Strand" (1904), "Deirdre" (1907), "The Great Helmet" (1910), and "The Player Queen" (1911). Later on, the influence of the Japanese stage was noticeable in his dramatic productions, as in the four "Plays for Dancers" (1921) and in "The Cat and the Moon" (1924).

Besides his dramas, YEATS successively published lyrical poems. A very severe critic of his own work, he rewrote many of his earlier productions. In regard to his verse, we may still mention "The Wind among the Reeds" (1889), "Responsibilities" (1914), "The Wild Swans at Coole (1917), "Later Poems" (1922), and "The Tower" (1927).

In his two books "Reveries over Childhood" and "Youth" (1915), as also in "The Trembling of the Veil" (1922), he tells the story of his own youth. A philosophic work called "A Vision" (1922) was printed privatley.

YEATS threw himself heart and soul into the emancipatory struggles of Ireland, dedicating to the Irish cause his "Poems written in Discouragement" (1913). He founded the Irish Literary Society, and in 1922 was created one of the first senators of the Irish Free state.

He also translated antique dramas for the Abbey Theatre, *inter alia* Sophocles', "King Oedipus," and "Oedipus on Colonnos."

In 1908 a collection of YEATS'S works appeared in eight volumes. The Nobel Prize was awarded him "for his inspired poetry, which in the strictest artistic form gives utterance to the spirit of a people."

ŁADISLAW REYMONT

Ladislaw Stanislaw REYMONT was born on May 6th, 1868, at Kobielo Wielkie, in what was then Russian Poland. The son of an organist, he was trained for the same calling, but was far more interested in reading. After an irregular education, mainly at home, he tried various activities besides playing the organ and helping to farm his father's few acres of land: thus he was for a time member of a company of itinerant actors, then again assistant in a store, and finally pointsman on a lonely railway line. Here he began to write short stories, and was fortunate enough to get some of them printed, but this led to the loss of his employment and to a breach with his family. After a pilgrimage to the famous, reputedly miracle-working image of the Virgin at Czestochowa, he wrote an account of this experience ("Pielgrzymka do Jasnej Gory") and was able to live for a time on the honorarium received therefor. Meanwhile his name had become known in literary circles. The next few years took him to London, where he joined the theosophist movement, and, after a sojourn at Lodz, also to Paris.

His first more important literary productions were the short story "Komedjantka," the novels "Spokanie" and "Fermenty" (a social study, 1898), and the tales "Ziemia obiecana," "Lili," and "W pierwsza noc."

His success as an author enabled him to visit Italy and to stay for a time at Sorrento. Shortly after his return to Poland, he was involved in a railway accident in the vicinity of Warsaw (1902) and severely injured. His health, which had never been very good, was permanently impaired by this misfortune.

In 1903/04 he wrote the first version of his great national epos, "Chlopi" ("The Peasants"), but burnt the one-volume manuscript, which had failed to satisfy him; by 1910 he had rewritten the book, extending it to four volumes. It was this masterly description of rural life and landscape in Poland that made REYMONT really famous, placing him in the foremost rank of European novelists. "Chlopi" ran through several editions and was translated into many foreign languages; it earned him the Literary Nobel Prize.

There followed "Wampir," an outcome of his interest in spiritualism, "Przed switem," "Marzycel," "Z Ziemi Chelmskiej," "Z pamietnika," "Na krawedzi," and "Za frontem." Two historical novels, "Rok Rzeczyposplitej" and "Insurekcja" dealt with tragic and heroic events in Polish history in the latter half of the 18th century.

His collected works, in seven volumes, appeared between 1919 and 1922. Obviously the edition in question does not comprise all he wrote.

In 1919/20 REYMONT paid a visit to America, mainly with a view to studying the living-conditions of Polish emigrants. Shortly after his return symptoms of serious heart-trouble became apparent. The autobiographical sketch he compiled for "Les Prix Nobel 1924" closed with the words: "J'ai beaucoup de choses encore à dire, les seules même que je désirerais ardemment faire connaître au public, mais, la mort y consentira-t-elle?"—Death did not consent: he died at Warsaw on December 5th, 1925.

NOBEL PRIZE for 1925

BERNARD SHAW

George Bernard SHAW was born in Dublin on June 26th, 1856; his father was a Civil Service clerk of English descent, his mother a singer. After working for a while as a clerk in Dublin, he went to London where he had miscellaneous jobs, being at one time an agent for EDISON'S telephones and at another piano-accompanist at concerts. During these years of irregular activity (1880—1885), at which time he took part in the Socialist movement, he wrote his first novels, which long remained unprinted: "Irrational Knot," "Life among the Artists," "An Unsocial Socialist," and "Cashel Byron's Profession," the last-named being a persiflage on England's adulation of sport.

In 1884 he joined the "Fabian Society," an association for strictly academic Socialist propaganda, edited the "Fabian Essays" in 1889, and himself wrote several political pamphlets, such as "Fabianism and the Empire" (1900), and "Fabianism and the Fiscal Question" (1904).

Meanwhile, as from 1888, he worked as a critic for the daily papers "Star," "World," and "Saturday Review," his field of criticism being first of all music and subsequently the drama (1895—1898); the fruits of this activity were two books, in one of which, "Quintessence of Ibsenism" (1891), he propagated IBSEN'S art on the English stage, while the other, "The Perfect Wagnerite" (1898), greatly contributed to the appreciation of WAGNER'S music in England. His brochure, "The Sanity of Art" (1895), in which he attacked Max NORDAU'S artistic exaggerations, aimed at improving contemporary æsthetic taste.

Criticism of the English stage led SHAW to dramatic productions of his own and thus to the development of his peculiar talents. His first seven plays, all of them highly original problem-plays of great technical perfection ("Widowers' Houses," "The Philanderer," "Mrs. Warren's Profession," "Arms and the Man," "You Never Can Tell," "The Man of Destiny," and "Candida" — which, possibly the most famous of them all, was written in 1894 but not acted until

1903) — were published in 1898 under the comprehensive title of "Plays Pleasant and Unpleasant." Two years later there followed "Three Plays for Puritans" (comprising "The Devil's Disciple," "Cæsar and Cleopatra," and "Captain Brassbound's Conversion"). His further series of satirical plays included "Man and Superman" (1903), "John Bull's Other Island" (1904), "Major Barbara" (1905), "The Doctor's Dilemma" (1906), "Getting Married" (1908), "The Shewing-Up of Blanco Posnet" (1909), "Misalliance" (1910), "Androcles and the Lion" (1912), "Pygmalion" (1913), and "Overruled" (1913). The two farces "O'Flaherty, V. C." (1915) and "Lord Augustus Does His Bit" (1916) were written in reference to the war, as was also the play "Heartbreak House" (1918). SHAW'S latest plays were "Back to Methusalah" (1921), the mock-heroic drama "Saint Joan" (1924), and "The Millionairess."

Besides satirically attacking, in his plays, all and every sort of insincerity, affected sentimentality, and indiscriminating adulation of recognised values and personalities, SHAW provided many of them with polemic prefaces serving the same purpose; thus "Getting Married" was introduced by an ironical philosophic discourse on sex and marriage, "Androcles" by one on Christianity, and "The Dark Lady of the Sonnets"" (1910) even by an attack on Shakespeare, from the standpoint that a blind deification of the poet was apt to stifle the development of an independent opinion.

During the World War SHAW wrote several brochures on political subjects, such as "Common Sense and the War" (1914), "How to Settle the Irish Question" (1917), and "Peace Conference Hints" (1919). In 1928 he published his "Intelligent Woman's Guide to Socialism and Capitalism." Apart from political questions at home and abroad, he advocated a reform of justice, the greater protection of animals, and war on all suffering in general.

When awarded the Nobel Prize for Literature in 1925, conferred on him "for his literary activity, based on idealism and humanity, and characterised by wholesome satire frequently blent with a poetic beauty of its own," he dedicated the entire sum to the purpose of an exchange of Swedish and English cultural values. Frequent visits to foreign countries of late years have resulted in numerous valuable contributions to the international press.

Bernard SHAW'S works have been widely translated, thus becoming the property of all civilised humanity.

His dramatic works appeared in a collected form in 1921.

NOBEL PRIZE for 1926

GRAZIA DELEDDA

Grazia DELEDDA was born in the little town of Nuoro, Sardinia, on October 9th, 1875. At an early age she grew to know the various types of the Sardinian populace. to the study of which she devoted her exceptional gifts of perception and affectionate criticism. While still at school she attracted attention by her clever literary treatment of various subjects; by one of her teachers she was encouraged to contribute tales and sketches to Italian newspapers. Her first novel, "Fior di Sardegna," was immediately accepted and published in Rome. It met with some appreciation, but her real fame was established a little later by another story, "Elias Portolu" (1900), which was soon translated into practically all European languages. In the year of its appearance the authoress settled permanently in Rome.

Grazia DELEDDA has made a name as lyric poet and also as dramatist; jointly with Camillo ANTONA-TRAVERSI she wrote a three-act play, "L'Edera."

It is for her novels and short stories, meanwhile, that she is preeminently known. Most of these deal with her Sardinian home. Those deserving special mention are the novels "Racconti sardi" (1895), "Anime oneste" (1896, with a preface by Ruggero BONGHI), "La via del male" (1897), "Cenere" (1904), "Nostalgia" (1905), "L'ombra del passato" (1907), "Il nonno" (1908), "Il nostro padrone" (1910), "Nel deserto" (1911), "Colombi e sparvieri" (1912), "Canne al vento" (1913), "Le colpe altrui" (1914), "Marianna Sirca" (1915), "L'incendio nell' oliveto" (1918), "Il segreto dell' uomo solitario" (1921), "La fuga in Egitto" (1926), and "Annalena Bilsini" (1929), and the short stories "I giuoche della vita," "It ritorno del figlio," "La bambina rubata," and "Il flauto nel bosco."

The Nobel Prize was conferred on DELEDDA "for her exaltedly idealistic writings, in which she has so plastically described life on her native island, and dealt with warmth and depth of feeling with general human problems."

Grazia DELEDDA died on August 15th, 1936.

NOBEL PRIZE for 1927

HENRI BERGSON

Henri BERGSON was born in Paris on October 18th, 1859. When he had completed his secondary-school curriculum he was uncertain whether to study philosophy or mathematics, both of which fields strongly attracted him; he decided in favour of the former and entered the École normale supérieure, which he quitted in 1881 to become a teacher in philosophy, first in the provinces, at Angers and at Clermont-Ferrand, and thereupon at various lyceums in Paris. In 1898 he was appointed in the same capacity at the "École normale supérieure" and two years later at the "Collège de France," where he first occupied the chair for antique, and later that for modern, philosophy. In 1918 he retired completely from his professorship, so as to devote himself entirely to philosophic studies.

Since 1914 BERGSON has been member of the French Academy.

In 1921 he was made chairman of the newly-founded "Commission internationale de Coopération intellectuelle," which position he retained until 1926, ultimately abandoning it by reason of ill-health.

In his first great work, the "Essais sur les données immédiates de la conscience" (1889), BERGSON founded a new spiritualistic line of metaphysics, resting entirely on intuition and introspection. According to his theory, the condition of consciousness acquired by a human being through intuition and introspection is characterised by a purely qualitative intensity, by a constantly changing, spaceless duration, and therefore by liberty. In his second book, "Matière et Mémoire" (1896), he established the existence and the possibility of "pure recollection," not necessarily dependent on a mental process, relegating the brain, as opposed to the mind, to the rank of a mere anatomical instrument of action.

It is this intensity of intuitively conceived conditions of consciousness, or what he calls "duration," that in BERGSON'S opinion makes up the real and essential contents of the world, manifesting itself as a constantly creative development of life, an "impetus of life" (élan vital), the aims of which are free creations, without being determined by any mechanical or teleological order of the universe. On the ruins of a superseded materialistic conception of life BERGSON thus founds a new idealistic conception, rendered all the more attractive by the vivid and convincing literary style in which it is set forth. These metaphysical explanations of the nature of life were elaborated in BERGSON'S third book, "L'Évolution créatrice" (1907), by which he exercised the strongest possible influence on what we may call the "philosophy of life" of the twentieth century. The same direction was followed up in "Ênergie spirituelle" (1919) and "Durée et simultanéité" (1923).

A shorter treatise, "Le Rire" (1900), emphasizes the æsthetic value and importance of laughter.

BERGSON'S intelligently and brilliantly written works have been translated into numerous foreign languages and widely distributed, so that their metaphysical value may be said to have spread far beyond the limits of France.

The Nobel Prize was awarded him "in recognition of his ample and fruitful ideas and of the brilliant art with which they have been set forth."

SIGRID UNDSET

Sigrid UNDSET was born at Kallundborg, Norway, on May 20th, 1882. She is the daughter of Ingwald Martin UNDSET, a well-known archæologist. Having attended a commercial school at Oslo, she held a small clerkship for a period of ten years (1899—1909). At school and in her office she acquired an insight into the shallow, meaningless life of other girls of her age; of this experience she made use in her first literary productions, two novels entitled "Fru Marta Oulie" (1907) and "Den lykkelige alder" (1908).

She established her fame in 1912 by the novel "Jenny," a story of Oslo, which was translated into English and German; it is remarkable for the courage evinced by the young authoress in her treatment of the erotic problem. The heroine's longing for a safe haven in love, it is true, leads her after a fruitless search to utter ruin.

UNDSET'S next book, "Vaaren" (1914), marks a fresh phase of development in her art: here, as in "Jenny," the problem is one of love and marriage, but this time the writer finds the way from pain and error to happiness and a vindication of life.

The mastery of form and language that characterised this latter novel was even more apparent in the following tales of King Arthur ("Fortällingen om Kong Arthur og Ridderne av det runde Bord," 1915), after which the writer again turned to the treatment of female problems in a collection of essays, "Et Kvinde-synspunkt" (1919), in which she asserts that woman's aim and object in life cannot be found in the glorification of an egotistic emancipation, but in the altruistic task of living for others, the task of a wife and a mother. UNDSET pursued similar problems in her novel "Fru Hjelde" (1917).

Meanwhile, from 1919 on, she passed through a religious crisis, which ended, six years later, with her conversion to the Roman Catholic faith; her marriage to the Norwegian painter SVARSTAD, to whom she had been married in Belgium in 1912, was dissolved in consequence of this change in belief.

1921 and the next two years gave birth to her great three-volume novel, "Kristin Lavransdatter," the gigantic epos of Kristin, daughter of Lavran, and her life in Gudbrandsdal. This monumental historical tale of Norway in the fourteenth century spread Sigrid UNDSET'S fame all over the civilised world. It was followed in 1925 by a thirteenth-century story, "Olav Audunssön i Hestviken," to which a sequel appeared two years later under the title of "Olav Augunssön og hans börn." In 1929 she published two further novels, "The Serpents' Cave" and "Gymnadenia," the latter being a tale of modern times, affording a picture of social, literary, and cultural life in the Norway of to-day.

UNDSET'S tales are remarkable for their profound psychology, and for her exceptional ability to portray the mentality and character alike of modern and of by-gone times. For her great epic pictures of the medieval history of her native land she created a style of her own, a happy blend of the ancient language of the Scandinavian sagas and the present-day narrative style of the profound psychologist.

The Nobel Prize for Literature was awarded her "mainly in view of her splendid descriptions of Scandinavian life in the Middle Ages."

Since 1919 Fru UNDSET has resided in the neighbourhood of Lillehammar, Hamar Stift.

NOBEL PRIZE for 1929

THOMAS MANN

Thomas MANN was born in the old Hansa city of Lübeck on June 6th, 1875. His paternal ancestors "were burgesses in Mecklenburg; they came to settle in Lübeck, where they were merchants in the days of the Holy Roman Empire;" his mother was a native of Brazil. He passed his boyhood in Lübeck amidst old patrician traditions, and later went to Munich, where, for the sake of practice, he worked for a while as an unpaid clerk in a fire-insurance office. At the age of twenty-three he published his first collection of short stories, entitled „Der kleine Herr Friedemann" (1898); these early tales already give promise of the gifts of eloquence and keen psychological observation that so distinguished his subsequent books.

In possession of independent means after his father's death, MANN quitted the clerkship, which was completely unsuited to his literary talents, and thenceforth devoted himself entirely to writing. For a few terms he studied at Munich University, but then repaired to Italy, where he had a lengthy sojourn in Rome, returning to Munich, however, for his year of compulsory military service. After this he was for a time assistant-editor of Albert LANGEN'S caricaturist paper „Simplizzissimus" and, during this restless period of youthful indecision, wrote his great masterpiece, the novel „Die Buddenbrooks," a fascinating and brilliantly constructed portrayal of Hanseatic patrician life, at the same time of considerable autobiographical interest. This novel was to see more than 150 editions and to make the author's name famous throughout the civilised world.

Already in the eight short stories which went to make up „Der kleine Herr Friedemann" MANN had been tempted to deal with problems of artistic life, decadence, and racial intermarriage, an "aberration" from normal bourgeois subjects which he himself at first deplored but subsequently came to welcome as a factor of purely personal value; in his „Bajazzo," in „Tonio Kröger," and particularly in „Die Buddenbrooks," such excursions into what might from the strict "patrician" standpoint be termed an "underworld" frequently recurred; they became characteristic of the author's outlook on life in general. The sub-title he chose for his great book was "The Decadence of a Family." It shows how a generation born of fundamentally sound and unspoiled antecedents will gradually lapse into instability and sentimental weakness, finally to "flicker out" completely.

The success attending this first great effort along fundamentally new lines reassured the young writer as to his mission in life. In 1905 he married the daughter of a university professor, and definitely settled down in Munich, subjecting himself to a rigid discipline in regard to his literary work and his manner of living.

There followed novels and short stories, in which he again dealt with the problems of artist life with its manifold psychological struggles and conflicts. The principal stories of this period were „Tristan“ (1903), „Der Tod in Venedig“ (1912), and „Tonio Kröger“ (1914). The undeserved reproach voiced against his „Buddenbrooks“ of writing sensational literature, such as had at that time been produced by an inferior novelist of the name of BILSE, he successfully repudiated in 1906 by his brochure „Bilse und ich.“

The year 1909 gave birth to his novel „Königliche Hoheit,“ which he called the "attempt at a comedy in the form of a novel." In the writer's own words it depicted "the salvation of 'highness' through love." The old tormenting contrast between work and happiness is here enlightened and overcome, the loneliness and privations of a worker, his work itself and its psychological obligations, are finally made to accord with life, love, and happiness. While the author's earlier characters had come to grief in their longing for the strong and brutal happiness of life, the short story „Fiorenza“ (1905) brought the victory of the spirit over the inhibitions of life, showing that in longing itself there is happiness, while an ardent spirit may engender heroism.

When the war broke out Thomas MANN had just completed a book on Frederick the Great; it appeared in 1915 under the title of „Friedrich und die große Koalition,“ furnished with a preface „Gedanken im Kriege“ and with a sort of epilogue „An die Redaktion des Svenska Dagbladet, Stockholm,“ affording him an opportunity of defending Germany against invidious attacks. This step on the part of the popular author was received by some with joyful enthusiasm, by others with bitter reproach, the writer's own brother, Heinrich MANN, figuring among his adverse critics. Beset with doubts, he sought to vindicate his attitude towards the problems of the day in his „Betrachtungen eines Unpolitischen“ (1918); later on he again expressed his opinion on conflicting political, social, ethical, and artistic problems in a collection of essays, „Rede und Antwort“ (1922), most of them written at a far earlier date, as were also his „Bekenntnisse des Hochstaplers Felix Krull,“ which appeared in 1923.

In his book on Frederick II. it was mainly an artistic problem that interested MANN, the dualism in the nature of a sovereign who, in the words of ROUSSEAU "pense en philosophie et se conduit en roi." In the recent war, too, Germany was seeking, in MANN'S opinion, for a "synthesis of power and intellect." Thus the writer remained true to himself even in the treatment of these subjects.

By the „Betrachtungen eines Unpolitischen“ MANN eased his mind, and was thus again able to turn to more idyllic themes; gladly did he abandon politics in favour of such intimate matters as children and animals. His „Gesang vom Kindchen“ and his „Herr und Hund“ surprised and delighted his readers by their tender treatment of detail. Mention may still be made of the volume of short stories, „Das Wunderkind“ (1914), the tale „Unordnung und frühes Leid“ (1926), and the two-volume novel „Der Zauberberg“ (1924). Here the writer once more displays a great image of society, and engages in a masterly delineation of reality and of the problems of life and the soul.

Thomas MANN was awarded the Nobel Prize "principally for his great novel, „Die Buddenbrooks,“ which in the course of years has met with constantly growing appreciation as a classic work of contemporary literature.

Thomas MANN now lives at Prague.

NOBEL PRIZE for 1930

SINCLAIR LEWIS*)

Sinclair LEWIS, son of a rural doctor, was born in a prairie village in Minnesota, that most Scandinavian of all American States, in the year 1885. Until he went east to Yale University he attended the ordinary public school along with many Madsens, Olesons, Nelsons, Hedins, and Larsons. Doubtless it was because of this that he made the hero of his second book, "The Trail of the Hawk," a Norwegian, and Sondelius, of "Arrowsmith," a Swede; to him, Sondelius is the favourite among all his characters. Of Carl Ericson, in "The Trail of the Hawk," he wrote — back in 1914, when he was working all day as editor of the George H. DORAN publishing company and all evening trying to write novels — as follows: "His carpenter father had come from Norway, by way of steerage and a farm in Wisconsin, changing his name, to Americanise it, from Eriksen .... Carl was second-generation Norwegian, American-born, American in speech, American in appearance, save for his flaxen hair and china-blue eyes. When he was born, the "typical Americans" of earlier stocks had moved to city palaces or were marooned on run-down farms. It was Carl Ericson, not a Trowbridge or a Stuyvesant or a Lee or a Grant, who was the typical "American" of earlier stocks had moved to city palaces or American destiny of extending the western horizon, his to restore the wintry Pilgrim virtues and the exuberant October partridge-drumming days of Daniel Boone; then to add, in his own or another generation, new American aspirations for beauty."

LEWIS drifted for two years after college as a journalist, a newspaper reporter in Iowa and San Francisco, a junior editor on a magazine for teachers of the deaf in Washington, D. C. The magazine was supported by Alexander Graham BELL, inventor of the telephone. What LEWIS did not know about teaching the deaf would have included the entire subject, but that did not vastly matter, as his position was so insignificant that it included typing hundreds of letters weekly, begging for funds for the magazine, and, on days when the negro janitress did not appear, sweeping out the office. Doubtless this shows the advantage of a university education, which was further shown when, at the age of twenty-five, he managed to get a position in a New York publishing house at fifteen dollars a week.

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*) This biography was modelled on a sketch kindly furnished by Mr. LEWIS himself.

From that New York position till the time, five years later, when he was selling enough short stories to the magazines to be able to live by free-lancing, he had a series of typical white-collar, unromantic, office jobs with two publishing houses, a magazine (adventure), and a newspaper syndicate, reading manuscripts, writing book-advertising, writing catalogues, writing uninspired book-reviews — all the carpentry and plumbing of the city of letters. Nor did his first five novels rouse the slightest whispers: "Our Mr. Wren," "The Trail of the Hawk," "The Job," "The Innocents," and "Free Air," published between 1914 and 1919, and all of them dead before the ink was dry.

"Main Street," published late in 1920, was his first novel to rouse the embattled peasantry, and it had really a success of scandal. One of the most treasured American myths had been that all American villages were peculiarly noble and happy, and here an American attacked that myth. Scandalous! "Some hundreds of thousands read the book with the same masochistic pleasure that one has in sucking an aching tooth."

Since "Main Street," his novels have been "Babbitt" (1922), "Arrowsmith" (1925), "Mantrap" (1926), "Elmer Gantry" (1927), "The Man Who Knew Coolidge" (1928), and "Dodsworth" (1929). During these years of novel-writing since 1915 he has lived a quite unromantic and unstirring life. He has travelled much, and on the surface it would seem that one who has been, during some twenty years, in forty states of the American Union, in Canada, Mexico, England, Scotland, France, Italy, Sweden, Germany, Austria, Czechoslovakia, Yugoslavia, Greece, Switzerland, Spain, the West Indies, Venezuela, Colombia, Panama, Poland, and Russia, must have been adventurous. This, however, would have been a typical error of biography. The fact is that his foreign travels have been a quite uninspired recreation, a flight from reality. "My real travelling has been sitting in Pullman smoking-cars, in a Minnesota village, on a Vermont farm, in a hotel in Kansas City or Savannah, listening to the normal daily drone of what are to me the most fascinating and exotic people in the world — the average citizens of the United States, with their friendliness to strangers and their rough teasing, their passion for material advancement and their shy idealism, their interest in all the world, and their boastful provincialism — the intricate complexities which an American novelist is privileged to portray.

The Nobel Prize was awarded LEWIS "for his great and living art of painting life, with a talent for creating types, with wit and humour."

ERIK AXEL KARLFELDT

Erik Axel KARLFELDT, whose real name was JANSDOTTER, came of old Swedish mining stock, and was born at Karlbo, Folkärna, Delecarlia, in the year 1864. The name which he made famous was formed by himself in 1889 out of that of his parental farmstead. Educated in his native village until 1878, he then attended the secondary school at Västeras, from which he matriculated in 1885. Studying at Uppsala University from 1885 till 1898 (with lengthy interruptions for the purpose of earning his livelihood), he passed his candidate-examination in philosophy in 1892 and his licentiate-examination six years later. Meanwhile, he had been a teacher, from 1893 to 1895, at the higher private school of Djursholm and since 1896 at the popular high-school of Molkom. For a short while he had been collaborating in a newspaper in Stockholm.

Having completed his studies, he was for five years "extra staff amanuensis" at the Royal Library of Stockholm; in 1903 he became librarian at the Agricultural Academy. In the meantime he had found recognition as a poet, and in 1904 he was accepted into the Swedish Academy. In the following year he joined the Nobel Institute of the Academy, and again two years later was included in the Nobel Committee. In 1912 he became permanent secretary of the Academy, and thenceforth devoted himself exclusively to this vocation and to his literary work, while continuing his activity on the Committee. In 1917 Uppsala University made him an honorary doctor.

While still at school, he had contributed individual poems to newspapers. His first collection, "Vildmarks och kärleksvisor," was printed in the autumn of 1895. It was followed by "Fridolins visor" (1898), "Fridolins lustgard" (1901), "Flora och Pomona" (1906), "Flora och Bellona" (1918), and "Hösthorn" (1927).

The "Proceedings" of the Swedish Academy published his biography of the Swedish poet LUCIDOR in 1909, and his necrologue of Carl Fredrik DAHLGREN in 1921.

In the latter decades of his life, in particular, he came forwards as a festival orator, in which capacity he met with constantly growing appreciation and admiration. Some months after his death on April 8th, 1931, a collection of his speeches was published.

The Nobel Prize was awarded him posthumously. He had refused the award ten years earlier on the grounds that he was not read outside Sweden (v. his article on "Why Sinclair Lewis got the Nobel Prize").

JOHN GALSWORTHY

John GALSWORTHY was born in 1867, of pure English stock for many generations. He was educated at Harrow and at New College, Oxford, and was called to the Bar in 1890, but practised little.

His first four books published under the pseudonym of John Sinjohn, were "From the Four Winds," a collection of ten shorts stories, in 1897, "Jooelyn" the following year, "Villa Rubein" in 1900, and "A Man of Devon" the year after. "The Island Pharisees" in 1904 was the first work to be published under his own name. In 1906 appeared "The Man of Property," the first volume of what was to be known as "The Forsyte Saga." This was followed by "The Country House" (1907), "A Commentary" (1908), "Fraternity" (1909), "A Motley" (1910), "The Patrician" (1911), "The Inn of Tranquility," studies and essays (1912), "The Dark Flower" (1913), "The Little Man and Other Satires" (1915), "The Freelands" (1915), "Beyond" (1917), "Fives Tales" (1918), "The Burning Spear," first published under the initials A. R. P.-M., (1919), "Tatterdemalion" (1920), "In Chancery," the second novel of the "Forsyte Saga" (1920), "Awakening" (1920), and "To Let," the third Forsyte novel (1921).

The year 1922 saw the publication of "The Forsyte Saga" as a whole, consisting of "The Man of Property," "Indian Summer of a Forsyte," "In Chancery," "Awakening," and "To Let." The family chronicles were continued in a second trilogy of novels with interludes, published together in 1929 as "A Modern Comedy," which consisted of "The White Monkey" (first published in 1924), "A Silent Wooing" (an interlude), "The Silver Spoon" (1926), "Passers-by" (an interlude), and "Swan Song" (1928)'. The two interludes were also published separately in 1927. "On Forsyte Change" (1930), a volume of short stories which "helps to fill in and round out the chronicles of the Forsyte family," comes in order between the "Saga" and the "Comedy." The entire series forms "The Forsyte Chronicles."

In 1923 was published "Captures," in 1925 "Caravan," the collected tales of John GALSWORTHY. The two most recent works, "Maid in Waiting" and its sequel, "Flowering Wilderness," appeared in 1931 and 1932 respectively.

As a dramatist GALSWORTHY wrote plays, important in the history of the drama both for their treatment and for their sociological contents. Revivals are constantly given, a successful "festival" of four of the plays was held early in 1932. His plays include "The Silver Box" (1906), "Joy" (1907) ,"Strife" (1909), "Justice" (1910), "The Little Dream" (1911), "The Eldest Son" (1912), "The Pigeon" (1912), "The Fugitive" (1913), "The Mob" (1914), "A Bit o' Love" (1915), "Foundations" (1917), "The Skin Game" (1920), "A Family Man" (1921), a volume of short plays (1922), "Loyalties" (1922), "The Forst" (1924), "Old English" (1924), "The Show" (1925), "Escape" (1926), "Windows" and "The Roof" (1929).

GALSWORTHY travelled extensively in the United States, Egypt, North and South Africa, and South America; while president of the Pen Club since its inception, (October, 1921) he attended its congresses in London, Paris, Brussels, Berlin, Vienna, Warsaw, Cracow, The Hague, and Budapest. He held honorary degrees, from Oxford, Cambridge, St. Andrews, Dublin, and Princeton, and in 1931 was created Honorary Fellow of his college (New College, Oxford). He was Romanes Lecturer for 1931. In July 1929 he was awarded the Order of Merit by King George V.

The Nobel Prize was conferred on him "for the distinguished power of description, which attains its highest expression in "The Forsyte Saga."

GALSWORTHY died on January 31st, 1933.

NOBEL PRIZE for 1933

IVAN BUNIN

van BUNIN comes of a highly-respected Russian family, of which various members were prominent in politics, arts and sciences in bygone times, among them, in particular, two writers of renown in the early years of the last century, Anna BUNIN and Vassilij JUKOVSKY-BUNIN; the latter, of Russo-Turkish parentage, was one of the most eminent representatives of Russian literature. Like the TURGENIEV'S and TOLSTOI'S, the BUNIN'S were members of the Russian nobility, possessing hereditary estates in the fertile steppes of central Russia.

Ivan BUNIN was born at Voronesh in 1870, and spent his childhood and early youth almost entirely on his father's estate. As a youth the death of a younger sister affected him so deeply that he seemed likely to succumb to a sort of regilious melancholy; this sad period in his life, however, fortunately passed over without leaving any morbid traces in his mind or soul. His artistic gifts first found utterance in painting, an inclination which greatly influenced his later literary work. At an early age he began writing verse and prose, and soon had the satisfaction of seeing his writings in print, in the form of four volumes of his own verses, two volumes of translations of English poetry, and no less than ten volumes of prose. Favourably received by the critics, these literary productions were also ere long awarded various prizes, of which the PUSHKIN Prize of the Russian Academy carried special weight.

In 1909 the said academy co-opted him one of its honorary members, a distinction corresponding to that of the "immortels" of the French Academy, one of whom, in earlier years, was BUNIN'S compatriot, TOLSTOI.

World fame, meanwhile, was naturally slower in coming to him, and that for various reasons. He has always kept strictly clear of politics, avoiding, even in his writings, the expression of any political attitude; apart from this, he can be grouped in no particular school of literature, being neither a symbolist nor a romanticist, neither a "decadent" nor a naturalist. Nor yet did he frequent the usual literary circles, preferring to live in the country or else to travel. He visited various parts of Russia, Italy, Turkey, Greece, Syria, Palestine, Egypt, Algeria, Tunis, and the tropics. To use the words of SAADI, it was his aim "to unveil the face of the earth and impress upon it the stamp of his own soul." At that time his interest thus referred mainly to philosophic, religious, moral, and historical problems.

In 1910 he published his novel, "The Village." This was the first of a whole series of books affording a truthful picture of the Russian soul, an unvarnished reflection of the character and morals of the Russian people, with all their lighter and darker shades. At the hands of the Russian critics and of the so-called "intelligenzia," always inclined to idealise the character of the people, such work called forth passionate controversies, which, however, only served to advertise BUNIN'S name, a result which was enhanced by his later writings.

In May 1918 BUNIN quitted Moscow owing to the Bolshevist regime and retired altogether to the country, but in February 1920 he thought it best to turn his back definitely on his beloved country, and has since then been living mainly in Paris or on the shores of the Mediterranean.

The Nobel Prize for Literature was awarded him for his pronounced artistic gifts, which have enabled him to depict in his prose the typical character of the Russian people.

NOBEL PRIZE for 1934

LUIGI PIRANDELLO

Luigi PIRANDELLO, one of present-day Italy's most prominent writers, was born at Girgenti (now Agrigento), Sicily, on June 28th, 1867. His education he received at Girgenti and Palermo, taking his university studies in Rome and Bonn. His promotion to a doctorate in philosophy ensued on the strength of a linguistic dissertation called "Sounds and Sound-development in the Patois of Girgenti." This was followed by two other learned treatises, "Arte e Scienza" (Rome, 1908) and "L'Umorismo" (Lanciano, 1908), in which he abandoned the linguistic for the the æsthetic problem. From 1897 to 1922 he was professor of æsthetics and rhetoric at the "Real Istituto superiore di Magistere Femminile" in Rome. More and more importance came to attach to his publications, born of this poetic bent; they comprised, in particular, six volumes of poetry and a translation of the Roman elegies of Goethe, appearing between 1889 and 1912.

PIRANDELLO'S main renown and importance, meanwhile, rest on his own literary creations, e. g. the prominent novels "Il fù Mattia Pascal" (1904), "I vechi e i giovani" (1913), "Si gira, quaderni di Serafino Gubbio operatore" (1916), and "Uno, nessuno e centomila" (1926), and his short stories, of which, between 1901 and 1919, no less than fourteen collections appeared. A complete edition of these short stories and of others, formerly unprinted, appeared in 1934 under the title of, "Novelle per un anno," in twenty-four volumes. His greatest masterpieces, however, were in the dramatic field; of these we may mention, "Il piacere dell' onestà" (1917), "Il giuoco delle parti" (1918), "Cosi è (se vi pare)" (1918), "Sei personaggi in cerca d' autore" (1921), "Enrico IV." (1922), "Vestire gli ignudi" (1922), and "La vita che ti diedi" (1923). Between 1915 and 1934 as many as 38 of his plays were performed; since 1920 they have been appearing in a collected form in the series "Masche re nude."

Many of his novels, short stories, and plays have been translated into all the principal languages, and many of his dramatic works figure on the repertories of the international stage.

The 1934 Nobel Prize for Literature was conferred on PIRAN-

DELLO "for his bold and brilliant renovation of the drama and the stage."

He died in 1937.

EUGENE O'NEILL

Eugene Gladstone O'NEILL, son of James O'NEILL, a popular romantic actor, was born in New York City on October 16th, 1888. The first seven years of his life were spent mostly in hotels and railway trains, as the actor's family accompanied him on his tours through the United States. From the age of seven to thirteen the boy attended Roman Catholic schools; subsequently he was for four years at a preparatory school, and for one year at Princeton University, whence he was expelled in 1907. For several years he led a wandering life, working at various occupations. For a while he was secretary of a small mail-order house in New York, then went on a gold-prospecting expedition in the wilds of Spanish Honduras, where he found no gold but contracted malarial fever. Returning to the United States, he worked for a time as assistant manager of a theatrical company on tour. After this he went to sea, later working in Buenos Aires for the Westinghouse Electrical, Swift Packing, and Singer Sewing-machine companies, but never held a job for long. After a second spell at sea, as A. B. seaman on trans-Atlantic liners, he was an actor in vaudeville and then a reporter on a small-town newspaper. At the end of 1912 his health broke down, and he spent six months in a tuberculosis sanitorium.

O'NEILL began to write plays in the autumn of 1913; the one-act play "Bound East for Cardiff" appeared in the following spring. It is, in his own opinion, the only one of the plays written in that period which has any merit. The same year he entered Harvard University to attend a course in dramatic technique by Professor G. BAKER, but he left before completing the course.

The year 1916 saw the first production of "Bound East for Cardiff" at the Provincetown Players' theatre, which, in the next few years, put on nearly all of his short plays; but it was not until 1920 that a long play, "Beyond the Horizon," was produced in New York. It was given on Broadway by a commercial management, at first only as a special matinée attraction four times a week; soon after, however, it had a regular run and was awarded the Pulitzer Prize, to be conferred on the dramatist again in 1922 for "Anna Christie" and for a third time in 1928 for "Strange Interlude."

The following is a list of all Mr. O'NEILL'S published and produced plays with the years when they were written: "Bound East for Cardiff" (1914), "Before Breakfast" (1916), "The Long Voyage Home" (1917), "In the Zone" (1917), "The Moon of the Caribbees" (1917), "Ile" (1917), "The Rope" (1918), "Beyond the Horizon" (1918), "The Dreamy Kid" (1918), "Where the Cross is Made" (1918), "The Straw" (1919), "Gold" (1920), "Anna Christie" (1920), "The Enperor Jones" (1920), "Diff'rent" (1920), "The First Man" (1921), "The Fountain" (1921/22), "The Hairy Ape" (1921), "Welded" (1922), "All God's Chillun Got Wings" (1923), "Desire under the Elms" (1923), "The Marco Millions" (1923/24), "The Great God Brown" (1925), "Lazarus Laughed" (1926), "Strange Interlude" (1926/27), "Dynamo" (1928), "Mourning Becomes Electra" (1929—31), "Ah, Wilderness" (1932), "Days without End" (1932/33).

MARTIN DU GARD

Roger Martin DU GARD was born at Neuilly, near Paris, in 1881. In 1908 his first book, "Devenir," appeared, followed in 1913 by the novel, "Jean Barois," in which he deals with the problem of belief, by "Le testament du Père Leleu," and, in 1921, by the supernovel "Les Thibault," his principal work which, in exceptionally pure and perfect language, presents a picture of contemporary life as background for a story of adolescence. This book has made the author renowned both in France and throughout Europe. With great objectivity and masterly skill he succeeds in showing, in the destinies of a family and their friends, how inevitably the period prior to 1914 had to lead to a warlike issue. In particular, the last part of this gigantic tale, the three volumes entitled "L'été," the subject of which is reminiscent of TOLSTOI'S "War and Peace," and by which the whole story may be said to be crowned, is likely to be handed down to future generations as a veritable "human document."

In his earlier novel, "Jean Barois," the days of Dreyfus are revived. In between, he produced other detailed novels, some peasant farces, and several comedies, in all of which his truly human sympathy, his honest judgment, and his humane tendencies find vivid expression.

By profession Martin DU GARD is an archivist. In 1937 he was awarded the newly-founded Literature Prize of the City of Paris and in the same year the Nobel Prize for Literature.

V.

BEARERS OF THE PEACE PRIZE

Alfred NOBEL'S love of peace was one of his fundamental characteristics; there was nothing assumed or artificial about it. Nor were his pacific intentions the outcome of a suggestion on the part of Bertha von SUTTNER, as has very widely been presumed to be the case. This mistaken impression SCHÜCK and SOHLMAN most emphatically opposed in their great book on NOBEL'S life and work.

NOBEL first got to know Baroness SUTTNER when seeking a secretary in 1876; he engaged her in this capacity, but her marriage finally prevented her from accepting the post. They subsequently met in 1887 and not again until 1892. NOBEL'S aspirations in the cause of peace, moreover, dated much further back than SUTTNER'S novel, „Die Waffen nieder," which appeared in 1889, or than her passionate anti-war feuilletons, published in the Vienna press in 1891.

Indeed NOBEL himself criticised SUTTNER'S ideas. ("To demand disarmament is practically to make oneself ridiculous, without benefiting any one . . . . My factories will perhaps sooner succeed in putting an end to war than your congresses will. When two opposing army corps are able to destroy each other in a second, all civilised nations will surely recoil in horror from war and dismiss their troops." Cf. SCHÜCK and SOHLMAN, p. 199 and p. 201). Meanwhile NOBEL himself energetically attacked the war mentality, recruiting the services of ARISTARCHI BEY, a former Turkish diplomat, whom he commissioned to keep track of the peace movement and to report to him thereon. It was NOBEL'S idea that, in case of a war breaking out, the neutral governments should in the first place, just as is customary in the case of a duel between individuals, establish whether there were sufficient reasons to justify a passage of arms. But ARISTARCHI BEY persuaded NOBEL that "the governments are as a matter of principle disinclined to recognise an obligation to refer to a court of arbitration, seeing that they are afraid of thereby harming their own interests in the event of no pacific solution ensuing. There are governments which, rightly or wrongly, believe that they can mobilise faster than the others, and do not wish to forfeit the great advantage over the enemy that would accrue to them through such a gain of time."

NOBEL considered the only real solution to lie in "a convention by which the governments engage jointly to defend any country that is attacked." Nay, NOBEL even opposed disarmament, saying in this regard, "I do not even know whether it would be desirable at present. A new tyranny — that of the lowest classes — is preparing in secret; its distant rumble is heard by many. But a peace ensured by the power of the united armies, which would inspire respect in any disturber of the peace, would soon lead to a relaxation, and it would become apparent that carefully but surely, year by year, the strength of the individual armies would be diminished, their presence being only justifiable in a country populated half by victims and half by murderers."

Even when, in 1893, he envisaged the plan of founding a peace prize and wrote to SUTTNER in this connection, he limited himself to quite general terms: "The prize would be awarded to him or to her who has made the greatest step to bring Europe nearer to the ideas of general peace." He absolutely declined as Utopian ideas both disarmament and a generally obligatory court of arbitration, the two chief factors in SUTTNER'S programme.

For this reason he formulated the conditions for the peace prize in the general terms which figure in his testament.

The endowment of such a prize, meanwhile, merely tends to show that the nobility of his sentiments was equalled by the wisdom and common sense that caused him never to lose sight of the limits of what was possible and actually feasible. It was the irony of fate that just NOBEL and his peaceful country of Sweden should have been destined to replace the "harmless" gunpowder, which for five centuries had ruled the militant world, by the invention and perfection of the most terrible explosives, thus furnishing the development of the modern art of war with the ghastliest of all innovations.

But is it not in the nature of an optimistic monition, an encouragement to be of good cheer, and not to lose faith in whatever is noble in humanity, that just he who created the most terrible means of destruction should desire the material proceeds it yielded to be employed for works of humanity, peace, and spiritual progress?

Ought this not to inspire us with hope and courage? With the hope that, from a base striving for wealth, for power, and for property gained by murderous violence, man is bound again and again to rise to the higher spheres of the mind, to the light of true humanity, and to the beatifying regions of art.

In this sense all civilised mankind ought, on the 10th of December of every year, gratefully to remember that great man Alfred NOBEL, to whose fame this present book aspires in some small measure to contribute.

NOBEL PRIZE for 1901

JEAN HENRY DUNANT

The writer and philanthropist, DUNANT, was born at Geneva on May 8th, 1828. Already at the time of the Crimean War his humanitarian interest turned to the question of the treatment of the wounded; in the Italian war of 1859 he himself repaired to the theatre of war to study similar conditions. He gained the conviction that the sanitary measures and institutions of the armies were wholly insufficient. His book, "Un souvenir de Solférino" (at which battle he had been present in person) was published in 1862; it was mainly instrumental in bringing about the Geneva Convention of 1864 and the foundation of the "Red Cross."

The Geneva Convention, due to DUNANT'S personal endeavours, was concluded in 1864 and renewed in 1906; by this agreement it was made obligatory for the signatory nations to spare and tend all such of the enemy as are sick or wounded in action, and also requires the exchange of such prisoners with the observance of certain precautions.

DUNANT, who lost his whole fortune through abortive speculations in 1867, thereafter lived successively in Paris, London, and Stuttgart, finally retiring to the village of Heiden, in the Swiss canton of Appenzell.

In 1897 the Swiss Federal Council awarded him the Binet-Fendt Prize, which is destined for those who "have rendered their country the best service."

DUNANT died at Heiden on October 30th, 1910.

NOBEL PRIZE for 1901

FRÉDÉRIC PASSY

Frédéric PASSY, who shared the first Nobel Prize for Peace with J. H. DUNANT, was born in Paris on May 20th, 1822. He studied law and held a government clerkship for a few years, but abandoned it in favour of journalism, at the same time devoting himself to social and economic studies. A series of lectures he delivered on these subjects at the University of Montpellier in 1860/61 made his name known to the general public. From 1874 to 1889 he was a Parliamentary Deputy of the Liberal Party; in 1877 he was elected a member of the "Académie des sciences morales et politiques."

At an early juncture he first espoused the cause of peace, and in 1867 he succeeded in founding the first French peace society, the "Ligue internationale et permanente de la paix," whose *spiritus rector* he remained throughout in the capacity of general secretary. By circulating a printed "Conférence sur la paix et la guerre" he initiated the publication of a "Bibliothèque de la paix."

After the war of 1870/71 he remodelled his society to form the "Société français des amis de la paix;" since 1889 it has been known as the "Société française pour l'arbitrage entre nations." PASSY was also an active collaborator in the "Revue de la paix," published by the same society. In 1889 and 1890 he was chairman of the peace congresses held in Paris. The Berne Peace Bureau likewise elected him a member.

Jointly with W. R. CREMER, PASSY founded the Inter-Parliamentary Union of Arbitration in 1889.

The ample fruits of his activity as a publicist included "Mélanges économiques" (1858), "La propriété intellectuelle" (1858), "Guerres et congrès" (1859), "La démocratie et l'instruction" (1864), "La guerre et la paix" (1867), "La question de la paix" (1891), "L'avenir de l'Europe" (1895), "L'héritage du XIX^e siècle" (1900), "Historique du mouvement de la paix" (1905), and, posthumously, "Éloges, notices et souvenirs" (1913).

PASSY died at Neuilly on June 12th, 1912.

ÉLIE DUCOMMUN

Élie DUCOMMUN was born at Geneva on February 19th, 1833. He rose to a position of importance in the "Département de l'Instruction publique" of his native canton, where at the same time he was editor-in-chief of the "Revue de Genève." At Berne, whither he subsequently removed, he edited a new periodical, „Der Fortschritt." Appointed general secretary of the Jura-Simplon Railway, he held this position until his retirement from public activity in 1903.

From an early age he devoted his spare time and energy to the interests of peace, *inter alia* conducting the French periodical "Les États-Unies d'Europe," the press-organ of the "Ligue internationale de la paix et de la liberté," founded in 1867. He took an active part in the meetings of this league and later also in the regular peace congresses started in 1889. When, at the third of these congresses, in Rome, 1891, the foundation of an international peace bureau was determined, DUCOMMUN undertook the arduous office of general secretary.

As from 1895 he published the "Correspondance bi-mensuelle" relating to the activities of the Peace Bureau.

DUCOMMUN, who enjoyed a great reputation as an orator, untiringly laboured, both orally and with his pen, for the principles of peace. Those of his books that deserve particular mention were "L'œuvre de la paix" (1893), "Le programme pratique des amis de la paix" (1897), and "Précis historique du mouvement en faveur de la paix" (1899).

DUCOMMUN was also the author of occasional short poems.

He died at Berne on December 7th, 1906.

NOBEL PRIZE for 1902

CHARLES GOBAT

Charles Albert GOBAT, who in 1902 was awarded the Nobel Prize for Peace jointly with his compatriot DUCOMMUN, was born at Tremelan, in the Bernese Jura, on May 21st, 1843. Studying law and the history of literature at Bâle, Héidelberg, and Paris, he took his degree in law and settled down at Berne as a solicitor, at the same time acquiring nomination as a private lecturer on French civil law at the Paris Sorbonne. Later he transferred his office to Délémont, also in the Berne canton, where he soon came to play an important rôle in administrative matters: in 1882 he was elected member of the cantonal council, being shortly afterwards entrusted with the conduct of instructional matters, and presiding over the Government Board of Berne in 1886 and 1887. From 1890 he was a member of the Swiss Federal Council.

In the year 1892 he became president of the fourth conference of the Inter-Parliamentary Union at Berne, and in this capacity was one of the founders of the permanent "Bureau interparlementaire de la paix," of which he was made director in 1906, in succession to Elie DUCOMMUN. Wholly gratuitously, but with none the less zeal and ability, he did all the preparatory work for the conferences and the arrangement of the agenda at a great sacrifice of time and labour."

As director of the "Bureau interparlementaire," he edited, from 1893 to 1897, the monthly publication, "La conférence interparlementaire," dealing with the peace question in general and with international law and courts of arbitration in particular. In this connection he frequently published articles and treatises from his own pen.

His other publications included "La République de Berne et la France pendant les guerres de réligion" (1891), "L'Histoire de la Suisse racontée au peuple" (1901), and "Le cauchemar de l'Europe" (1911).

GOBAT died at Berne on March 16th, 1914.

SIR WILLIAM RANDAL CREMER

Sir William Randal CREMER was born at Fareham, Hampshire, on March 18th, 1838. He owed his education almost entirely to his mother. Having been apprenticed to a joiner, he went up to London where he soon came to play a prominent part in the Carpenters' Trades Union. In 1859 he himself founded the Amalgamated Carpenters' and Joiners' Union, and was for a long time one of the leaders of the trades-union movement in Great Britain.

When the Socialist "International" was founded in 1864 he became its secretary, a post he held for two years and a half.

At the time of the Franco-Prussian War he founded "The Workmen's Peace Association," which later on developed into the "International Arbitration League." Of this he was not only secretary but in every respect the *spiritus rector*.

In 1885 he was elected to Parliament, of which, save for an interruption from 1895 to 1900, he was a member for the rest of his life, figuring as one of the most energetic representives and champions of the cause of international peace.

In collaboration with Frédéric PASSY, leader of the French peace movement, whom he got to know in Paris in 1888, CREMER founded the Inter-Parliamentary Union for International Courts of Arbitration (inter-parliamentary peace conferences). In his capacity of secretary of the International League of Arbitration he was the permanent editor of the league's organ, "The Arbitrator," which first appeared in 1871.

When the Nobel Prize for Peace was awarded him in 1903 he donated the greater part of the sum to the League of Arbitration to form a fund for the purpose of carrying on his peace endeavours.

CREMER died in London on July 25th, 1908. He had been a chevalier of the Legion of Honour as from 1892, and was knighted by King Edward VII. shortly before his death.

NOBEL PRIZE for 1904

GHENT INSTITUTE FOR INTERNATIONAL LAW

The year 1875 saw the foundation, at Ghent in Belgium, of a private, unofficial association under the title of "Institut de droit international," its main object being that of keeping track, scientifically and practically, of the developments of international law, and of studying such difficulties as might stand in the way of its application. The means to this end were to be in the form of instructive publications and of periodical congresses in various countries, for which the services of acknowledged experts on international law were to be recruited.

The instigators and founders of this Institute were F. LIEBER, G. MOYNIER, J. K. BLÜNTSCHLI, T. M. C. ASSER, and the later Belgian minister G. ROLIN-JAQUEMYNS. Besides its regular "Revue de droit international," the Institute has since 1877 published an "Annuaire," containing the reports and minutes of its meetings, and in 1893 edited a "Tableau général de l'organisation, des travaux et du personal de l'Institut."

The idea of international arbitration, as voiced by the Institute already on the occasion of its 1875 meeting at the Hague (and supported by a set of regulations for practical realisation), essentially prepared the way for the first international Arbitration Conference, which was held, again at the Hague, in 1899. The Institute had likewise studied the problem of neutrality in the event of war, and had recommended the neutralisation of the Suez Canal. A codification of laws relating to warfare, which was worked out by the Institute, served as a basis for the deliberations of 1899. The submarine cable, the treatment of private property in war, international private law, and many other questions were dealt with in detail by the Institute, and subjects of deliberation at repeated conferences at the Hague.

BARONESS BERTHA VON SUTTNER

Bertha, Baroness von SUTTNER, who was by birth a Countess KINSKY, was the daughter of a lieutenant-fieldmarshal in the Austrian army. She war born in Prague on June 9th, 1843. From her mother, who came of the same family as the heroic German poet, Theodor KÖRNER, and who was herself something of a writer, Bertha KINSKY inherited that talent which was to place her in the forefront of the female writers of pre-war Austria.

In 1876 she was married to Arthur Gundaccar, Baron von SUTTNER, who was also a writer. For the first nine years of their married life they were principally travelling (with a fairly lengthy stay at Tiflis in the Caucasus), but subsequently they settled at Hartmannsdorf castle near Ernstbrunn, Lower Austria, where Bertha von SUTTNER devoted herself to literary production.

The year 1889 gave birth to her remarkable and in part autobiographical two-volume novel, „Die Waffen nieder!“ which aroused the sympathies of multitudes of readers for the principles of peace it so eloquently advocated. Thenceforth she threw herself heart and soul into the pacifist cause, and in 1891 founded the „Verein der Friedensfreunde“ in Vienna, of which she was herself the president. From 1892 to 1899 she edited the monthly publication, „Die Waffen nieder!“ At the same time she joined the committee of the Permanent Peace Bureau of Berne, of which she was vice-president from 1899.

She also propagated the idea of peace by means of lectures in France, Belgium, Holland, Denmark, and America, and by means of articles contributed to newspapers and periodicals.

Bertha von SUTTNER, moreover, came into personal touch with Alfred NOBEL in the realm of peace propaganda; it was she who kept him regularly informed as to the progress of the movement. His presence at the Berne Peace Conference of 1892 was likewise due to her persuasion.

In 1900 she published „Die Haager Friedenskonferenz, Tagebuchblätter,“ in 1904 „Der Krieg und seine Bekämpfung,“ and in 1906 „Randglossen zur Zeitgeschichte.“ A lecture she delivered in Munich, most concisely setting forth her attitude in the matter of peace, appeared in print under the title, „Krieg und Frieden“ (1900).

In regard to her other novels, we may mention “High Life” (1884), “Trente-et-quarante” (1893), „Das Maschinenzeitalter“ (published anonymously in 1889 and under her own name ten years later), „Schach der Qual“ (1899), „Martha's Kinder“ (1902), and „Briefe an einen Toten“ (1904). In 1909 she published her „Memoiren.“

Upon her husband's death in 1902 Baroness von SUTTNER removed to Vienna, where she continued to reside until her own decease on June 21st, 1914, but a few days before the outbreak of the war she had so strenuously worked to prevent. After her death A. H. FRIED collected her smaller pacifistic writings and published them in two volumes under the title of „Der Kampf um die Vermeidung des Weltkrieges.“

NOBEL PRIZE for 1906

THEODORE ROOSEVELT

Theodore ROOSEVELT was born in New York City on October 27th, 1858; he came of a Dutch family that had settled in America in the seventeenth century. After studying in Germany and at Harvard University he was elected, as a Republican, to the New York State Assembly, where he immediately made his mark as a fearless, honest, and untiring worker and as a reformer of abuses. In 1884, in which year he figured in a delegation to the National Political Convention, domestic grief, which told upon his health, sent him to the "wild west," where he worked as a cowboy and engaged in the pursuit of big game. This led to his writing "The Winning of the West" (4 vols., 1889—1896), "Hunting Trips of a Ranchman," and "Personal Experiences of Life on a Cattle Ranch" (1885), "Ranch Life and Hunting Trail" (1888), and "The Wilderness Hunter" (1893). Steeled in body and mind, he returned to New York in 1886, and once more plunged into political activity. In that year he was a candidate for the New York City mayoralty, but was defeated by "Tammany Hall." Three years later President HARRISON appointed him to the National Civil Service Commission, on which he served until May, 1895, when, mainly owing to his stout antagonism to graft, he was made president of the New York City Police Board; in this capacity he effectively broke up the business of blackmail and vice-protection by police operatives. In 1897 he entered the Navy Department as assistant secretary. When war broke out with Spain he raised the famous troop of Rough Riders from among his western ranchmen and was appointed their colonel; with them he took part in the battle of Santiago (1898). Shortly after his return, he was elected Governor of New York State. As the Republican nominee he became vice-president of the United States early in 1901, and automatically advanced to the presidency upon the assassination of M'KINLEY in September of that year; he was re-elected President in 1904.

As regards Theodore ROOSEVELT'S presidential administration, suffice it here to say that, while zealously preserving American interests abroad and especially in the Pacific, he was bent on all manner of reform in home politics, with particular reference to the control of such trusts as threatened to become monopolies, and even extending to a revision of the laws of spelling.

In the summer of 1905 President ROOSEVELT rendered invaluable service to the cause of peace by inducing Russia and Japan to enter into peace negotiations.

In addition to the books already mentioned, ROOSEVELT wrote "The Naval War of 1812" (1882), "The Life of Thomas Hart Benton" (1887), "The Life of Governor Morris" (1888), "American Ideals and other Essays" (1897), "The Rough Riders" (1899), "The Strenuous Life" (1900), "Oliver Cromwell" (1901), "True Americanism" (1903), and "An Autobiography" (1903).

Theodore ROOSEVELT was American President until 1909; he was succeeded by TAFT, likewise a Republican. By subsequently opposing his successor, ROOSEVELT brought about a split in his party, which resulted in the Democratic victory of 1912.

ROOSEVELT died at Sagamore Hill, New York, on January 6th, 1919.

NOBEL PRIZE for 1907

ERNESTO THEODORO MONETA

Ernesto MONETA was born in Milan on September 20th, 1833. Fired by the example of his father, an ardent Italian patriot, he took part, as a youth of fifteen, in the unsuccessful rising against Austria in 1848, and eleven years later again fought for Italian liberty, this time in Calabria. He thereupon continued to do military service until after the ill-fated battle of Custozza (1866). Turning his attention to journalism, he joined the great Milan paper, "Il secolo," in the following year; ere long he was its editor-in-chief, continuing to conduct it until 1896. He also founded the fortnightly review, "La Vita Internazionale."

As from 1870 he devoted his attention principally to the international peace movement, organised an "international peace meeting" in Milan in 1878, and in 1887 founded an Italian peace society called the "Unione Lombarda." His paper, "Il Secolo," afforded him a most effective means of promoting and propagating his pacific endeavours. From 1895 he represented Italy at peace congresses. He presided over the XVth International Peace Congress, which was held in Milan in 1906.

It was his aim and endeavour that all armies should be limited to defensive corps for protecting the individual countries, as the Swiss army is. He zealously worked for closer relations between Italy and France; at the same time he was anxious to see the restoration of amicable relations with Austria, and condemned the anti-Austrian irredentist movement.

His principal publication was "Le guerre, le insurrezioni e la pace nel secolo decimonono" (1903), which comprised the essence of his journalistic activity in regard to peace.

MONETA died in Milan on February 10th, 1918.

LOUIS RENAULT

Louis RENAULT was born at Autun in the French department of Saône-et-Loire on May 21st, 1843. He went in for law, and was admitted in 1868 to the university of Dijon as lecturer on Roman and commercial law. Five years later he was invited to the faculty of law of the Sorbonne, at which university he was professor of international law as from 1881. Besides this occupation, he acted from 1890 onwards as legal adviser to the French Government, as he was acknowledged to be the greatest French authority on international law. In 1875 he had joined the "Institut de droit international," acquiring full membership in 1882. He was also a member of the Hague Court of Arbitration, and in 1899 and 1907 represented France at peace conferences at the Hague.

Besides this, he organised various international conferences and inquiries, at most of which he himself presided. This was the case at Turin, in 1880, in regard to the general failure of international relations, in Paris in 1881/82, regarding the protection of submarine cables, in Berne in 1885/86, and again in Paris in 1896, with reference to the protection of proprietary rights in literature and art, at the Hague in 1893, 1894, 1900, and 1904 concerning international private law, in Paris in 1902 on the question of the slave-trade, and at Geneva, in 1906, anent the treatment of the sick and wounded in war-time. At the Hague conferences he stoutly advocated the extension to naval warfare of the regulations of the "Geneva Convention" and also the general introduction of international law.

RENAULT wrote "Introduction à l'étude du droit international" (1879), "Précis de droit commercial" (1884), and, jointly with LYON-CAEN, a "Traité de droit commercial" (7 vols., 1889—1897; 5th edition, 1921); furthermore, "Discours" (1907) and "Les progrès récents du droit des gens" (1912). He also edited the "Archives diplomatiques" from 1880 to 1900.

RENAULT was member of the "Institut de France." In 1906 his pupils had a medallion struck in his honour.

He died at Barbizon, Seine-et-Marne, on February 8th, 1918.

KLAS PONTUS ARNOLDSON

ARNOLDSON was born at Göteborg, Sweden, on October 27th, 1844. He was at first a railwayman, but at the same time engaged in journalism, advocating a practical "Christianity of action;" in 1881 he quitted his work on the railway so as to devote himself entirely, both as an orator and with his pen, to the cause of peace and the enlightenment of his contemporaries. From 1882 to 1887 he was a member of the Swedish Riksdag and as such founded, in 1883, the Swedish Society for Arbitration and Peace, as secretary of which he continued to act for many years.

From 1887 he delivered numerous public addresses in Sweden and Norway on peace ideals, with special reference to international courts of arbitration. Poor health, however, eventually obliged him to abandon this exhausting activity, and in later years he limited himself more and more to literary work. His first brochure, "Är världsfred möjlig?" ("Is World-Peace Possible?" — Stockholm, 1890), was subsequently translated into many languages under the title of "Pax mundi." He also wrote critical reports on the Hague conferences, and in 1903 published "Maria Magdalena," a pacifist novel.

In the question of a separation of the Swedish-Norwegian Union ARNOLDSON'S standpoint was throughout in favour of a peaceful solution.

He died in Stockholm on February 20th, 1916.

FREDERIK BAJER

Frederik BAJER, who in 1908 was awarded the Nobel Peace Prize, jointly with K. P. ARNOLDSON, was born at Vesteregede near Nästved, Denmark, on April 21st, 1937. He entered the army and took part, as a lieutenant in the dragoons, in the war against Prussia and Austria in 1864, but later quitted military service, and, after extensive linguistic studies, became a licensed teacher and translator. It was his interest in foreign languages that made him a pacifist. He came into contact with the Peace League founded by PASSY in 1867, was for many years member of the Danish Folkething, and in 1882 founded the Danish Peace Society, whose president he was until 1891. From 1884 on he also took part in the deliberations of the peace congresses, and it was upon his suggestion that, in 1890, at a peace congress meeting in London, the Berne "Bureau international permanent de la paix" was first initiated, to be definitely realised in the following year at the congress in Rome. Of this Bureau BAJER was the first president, a position he held until 1907.

BAJER advocated the active participation of the Scandinavian nations in the peace movement; in 1907 he founded a special Scandinavian inter-parliamentary union.

The most important of his numerous works were "Nordiske Nevralitetsforbund" (1885), "Ideen til Nordens, särlig Danmarks vedvarende nevralitet, dens oprindelse og udvikling" (1900), and "Det skandinaviske Nevralitetssystem" (1906). Several of his writings dealt with Denmark's attitude in various wars; the latest of these was "Nordens, särlig Danmarks Nevralitet under Krimkrigen."

BAJER, who in his latter years was honorary president of the Berne International Permanent Peace Bureau, died in Copenhagen on January 23rd, 1922.

AUGUSTE BEERNAERT

Auguste Marie François BEERNAERT, a Belgian of Flemish stock, was born at Ostend on July 26th, 1829. A lawyer by profession, he was elected to the Belgian Chamber of Deputies in 1874, and figured on the Liberal wing of the Clerical Party. From 1874 till 1878 he was Minister of Public Works in the MALOU Cabinet, and in 1884 he was appointed Prime Minister and, simultaneously, Minister of Finance.

He was instrumental in putting through the reform of the constitution in 1894, by which general suffrage and the list-system of elections were introduced; this development, however, cost him his seat in the Cabinet. From 1895 till 1899 he was President of the Chamber. BEERNAERT took a prominent part in King Leopold II.'s colonial policy; it was under his presidency that the Belgian Congo was established.

From 1899 he was Belgian delegate to the Hague Peace Conference, in which capacity he worked zealously in the interests of international peace. *Inter alia,* he dealt prominently with the Mexican question in 1902, and with the inviolability of enemy property in 1907. In 1908 he was elected chairman of the "Conseil interparlamentaire."

BEERNAERT was also the founder of the "Vlaamsche Academie voor Taalen Letterkunde" at Ghent.

He died at Lucerne on October 6th, 1912.

BARON PAUL D'ESTOURNELLES

Paul Henri Benjamin, Baron D'ESTOURNELLES DE CONSTANT DE REBECQUE, was born at La Flèche, in the French department of Sarthe, on November 22nd, 1852. Having made a thorough study of Oriental languages and travelled extensively in the Orient, he entered the diplomatic service. After being employed as counseller of legation at various Oriental courts, he held similar positions in London and at the Hague between 1892 and 1894. From 1895 to 1904 he was a member of parliament, and in the latter year he was made a senator.

From 1899 onwards Baron D'ESTOURNELLES officially represented France at the Hague peace conferences, quite particularly at the conference of 1907. It was in this capacity that, at a meeting in Stockholm in 1921, he made a laudable, if vain, effort to induce the French group of the Inter-Parliamentary Union to deliberate in common with the Germans.

As a writer he had already aroused attention by his first publication, "La politique française en Tunisie" (1891), which earned him a prize of the French Academy. His later writings dealt with the problems of peace and arbitration courts: "La conciliation internationale" (1906), "La politique extérieure de la France" (1910), and "Les Etats-Unis d'Amérique" (1913).

From 1919 D'ESTOURNELLES was at the head of the administration of the French national museums.

He died at Bordeaux on May 15th, 1924.

INTERNATIONAL PEACE OFFICE

n the year 1891 the Danish pacifist, Fredrik BAJER, founded the "Bureau international permanent de la paix," whose statutes were approved in 1892 by the general assembly of the Peace Society. To this Bureau the peace organisations of the various countries are attached.

The seat of the Peace Office was originally in Berne.

The main object of the Peace Office is to prepare and elaborate the questions and motions to be brought before the peace congresses, organise the congresses themselves, and put their resolutions into effect.

It is in receipt of regular subventions from Switzerland, Denmark, Sweden, and Norway.

The International Peace Office publishes a "Correspondance bimensuelle" and an "Annuaire du mouvement pacifiste."

An American affiliation was founded in Washington in 1894.

At present the seat of the Peace Office is in Geneva.

TOBIAS ASSER

Tobias Michael Carel ASSER was born in Amsterdam on April 29th, 1838. An eminent jurist, he was professor of law at the Amsterdam "Athenæum," and later at the university of Amsterdam, but abandoned his professorship when created member of the State Council in 1893. In the following year he was accorded the title of a Minister of State.

Jointly with JACQUEMYNS and WESTLAKE, ASSER founded, in 1869, the "Revue du droit international et de législation comparée" (at first known as "Archives du droit international"). He was likewise one of the founders of the "Institut de droit international." On his initiative the Dutch Government convoked to the Hague four conferences on international private law in 1893, 1894, 1900, and 1904, respectively; at all of these ASSER was in the chair.

As his most important publications we may mention: "Schets van het Nederlandsche Handelsrecht" (which had reached its thirteenth edition by 1908), "Schets van het international Privaatrecht" (1879), "La convention de la Haye du 14 novembre 1896 relative à la procédure civile" (1901), and "La codification du droit international privé" (1901).

ASSER'S activity found recognition in the form of numerous honours and distinctions both in Holland and abroad; thus he was made an honorary doctor of Cambridge, Edinburgh, and Bologna universities.

He died at the Hague on July 29th, 1913.

ALFRED FRIED

Alfred Hermann FRIED, who shared the Nobel Peace Prize with Tobias ASSER in 1911, was born in Vienna on November 11th, 1864. He was at first a bookseller and subsequently a journalist. Bertha von SUTTNER having aroused his interest in the cause of pacifism, he co-operated with her in 1891 in starting a periodical under the title of her novel „Die Waffen nieder!“; this he carried on, as from 1899, under the title of „Die Friedenswarte,“ publishing principally articles of his own on the subject of peace. He also took active part in all other endeavours towards combating warfare.

FRIED'S principal books on this subject were: „Das Abrüstungsproblem“ (1905), „Handbuch der Friedensbewegung“ (1905, republished in two volumes between 1911 and 1913), and „Pan-Amerika“ (1910).

A collection of his most important articles from the „Friedenswarte“ appeared in 1909 as „Der kranke Krieg.“ Under the title of „Der Kampf um die Vermeidung des Weltkrieges,“ he published in 1917 a collection of Bertha von SUTTNER'S smaller pacifist writings.

FRIED died in Vienna on May 5th, 1921.

NOBEL PRIZE for 1912

ELIHU ROOT

Elihu ROOT was born at Clinton, in the State of New York, on February 15th, 1845. He studied law at New York University, graduated in 1867, and very soon came to be known as the most prominent lawyer in the United States.

An active and ardent Republican, he was Secretary of War under M'KINLEY'S administration in 1899, and again from 1901 to 1903. In the latter year he was appointed a member of the Alaskan Boundary Commission, and in 1905 was made Secretary of State, on the death of Senator HAY. In this capacity he made a tour of the South American republics in 1906, in connection with the Pan-American Congress at Rio de Janeiro, and in several speeches emphasised the solidarity of interests among the states of the New World and their objection to interference by European nations. In 1907 he visited Mexico, where again it was his endeavour to conciliate the claims of the Latin and Anglo-Saxon republics of America. In the same year his initiative led to the convocation in Washington of the Central American Peace Conference, followed, in 1908, by the establishment of a permanent court of arbitration for the Central American states at Carthago, Costarica.

It was mainly due to ROOT'S mediation that, in 1906, in the conflict between the United States and Japan on the question of Japanese immigration to California, a peaceful solution was reached, resulting in the immigration laws of the following year.

ROOT also zealously championed the independence of China and advocated, albeit in vain, the introduction of an obligatory arbitration agreement between the United States and Great Britain. He was, furthermore, the instigator of what is known as the "Root Resolution," prohibiting war on commercial vessels; this was accepted by Congress in 1922.

After retiring from active political life ROOT continued to be a prominent champion of pacifist ideas. He presided at the meetings of the American Society for International Law and of CARNEGIE'S Peace Endowment.

His book, "Men and Policies", appeared in 1924.
ROOT died at an advanced age on February 7th, 1937.

NOBEL PRIZE for 1913

HENRI LA FONTAINE

Henri LA FONTAINE was born in Brussels on April 22nd, 1854, and studied law at the university of his native city. In 1893 his *alma mater* appointed him professor of international law. Since 1895 he has been a member of the Belgian Senate, representing Liège in the interests of the Social Democratic Party.

Ever since 1883 LA FONTAINE has been active in the cause of peace. In 1899 he was appointed secretary general of the newly-founded Belgian League for Arbitration in International Conflicts; he was also one of the founders of the Berne Peace League. One of the most enthusiastic members of the Inter-Parliamentary Union, he was a deputy to all inter-parliamentary conferences, and in 1912 was elected reporter on the Geneva Commission for International Jurisdiction.

Jointly with Paul OTLET he founded the "Office central des Associations internationales" in Brussels in 1907; he likewise organised the two "Congrès mondiaux des Associations internationales" which took place in Brussels in 1910 and 1913 respectively.

In 1895, also in collaboration with OTLET, he founded the international "Institut Bibliographique" in Brussels, publishing an "Essai de bibliographie de la paix" in 1891 and an accurate "Bibliographie de la paix et de l'arbitrage" in 1904. His chief publication, meanwhile, was the "Pasicrisie internationale," an historic record of international courts of arbitration from 1794 till 1900 (Berne, 1902).

LA FONTAINE has, moreover, repeatedly endeavoured to bring about a Franco-German rapprochement by Belgian mediation.

NOBEL PRIZE for 1917

RED CROSS COMMITTEE

In the year 1863 the "Comité international de la Croix-Rouge" was founded in Geneva, its task being the realisation of the idea set forth one year earlier by Henry DUNANT in his book, "Un souvenir de Solférino," the idea of establishing associations in all civilised countries for the nursing of war casualties and of ensuring them, by international agreements, reciprocal protection on the battle-fields, and inviolability for their hospitals and transports. The outcome of these endeavours was the so-called Geneva Convention of 1864 and, in due course, the establishment of branches of the "Red Cross" in all civilised countries.

1869 first saw the publication, by the central office, of a "Bulletin international," serving as a link between the branch-offices. In particular, it was a question of constantly improving the stipulations and conditions of the Geneva Convention and of extending them to naval warfare. This led to the conclusion of a new Convention in 1906.

Upon the outbreak of the World War the RED CROSS was faced with the difficult task of maintaining the observance of the Convention by the belligerent powers, of protesting against any infringement of the agreements, which had practically the value of international law, and, above all, of providing means to meet the tremendously increased and wholly unforeseen claims made upon the organisation. The exchange of prisoners-of-war and the improvement of their conditions in captivity were also matters that called for close attention. It was principally through Swiss mediation and across Swiss territory that an exchange of prisoners was effected.

In 1914 the RED CROSS COMMITTEE also instituted an "Agence internationale de secours et de renseignements en faveur des prisonniers de guerre," whose task it was to establish communication between prisoners-of-war and their relatives, or to inform the latter as to the prisoners' welfare.

The Committee's first president was General DUFOUR, who held this post until his death in 1875; he was succeeded, in turn, by

Gustave MOYNIER till 1910, Gustave ADOR till 1917, Edouard NAVILLE till 1926, and, since then, by Dr. Max HUBER.

WOODROW WILSON

Thomas Woodrow WILSON was born at Staunton, Virginia, on December 28th, 1856, and studied at Princeton and Baltimore, graduating at the latter university in 1886 with a dissertation, of value even at the present day, on "Congressional Government, a Study in American Politics."

Having taught history and political economy for three years at Bryn Mawr College (for girls) in Pennsylvania, and then for two years in the Wesleyan Faculty, he was appointed in 1890 to the chair of jurisprudence and political economy at Princeton, which he occupied till 1902; in that year he was elected President of the same university.

It was at Princeton that he began to take a keen interest in the politics of the day. Meanwhile, owing to his brilliant activity as a teacher, and to various remarkable publications from his pen, his renown so increased that in 1910 he was elected Governor of New Jersey, and two years later United States President. He commenced his administration in 1913, backed by a Democratic majority in both houses of Congress; his most important achievements in the first two years were the "Underwood Tariff Act" and the "Federal Reserve Act in 1913, and the "Federal Trade Commission Act", and the "Clayton Antitrust Act" in 1914.

When war broke out in Europe WILSON insisted on a policy of strict neutrality, and personally joined TAFT'S "League to Enforce Peace." Nevertheless, he could not prevent the United States from going into the war on the side of the Allies in 1917.

At the close of 1918 WILSON was enthusiastically welcomed as an angel of peace, but his attempts to arrive at a truly satisfactory settlement were frustrated by inordinate national aspirations in Europe. He himself headed the American delegation at the peace conferences.

His writings include "The State-Elements of Historical and Practical Politics" (1889), a biography of "George Washington" (1896), a great five volume "History of the American People"

(1902), "Constitutional Government in the United States" (1908), "The New Freedom" (1913), "On Being Human" (1916), and "International Ideals" (1919). His speeches and essays likewise appeared in several editions (1893 and later).

WILSON died on February 3rd, 1924.

NOBEL PRIZE for 1920

LÉON BOURGEOIS

Léon Victor Auguste BOURGEOIS was born in Paris on May 21st, 1851. After holding various posts in the administrative service of the Republic he was appointed prefect of the Tarn department in 1882, and of Haute-Garonne in 1885; two years later he became Police Prefect of Paris, but in the following year entered upon a political career. Having represented the Marne department on behalf of the Radical Party, he was made under-secretary of state in the Ministry of the Interior; in 1889 he was Minister of Interior in TIRARD'S Cabinet, in 1890 Minister of Instruction under FREYCINET, and later under LOUBET, and in 1892 Minister of Justice under RIBOT. In 1895 he himself undertook the formation of a Radical Cabinet, and in 1898 was again Minister of Instruction under BRISSON. In 1902 he was made President of the Chamber, in 1905 Senator, and in the following year Minister of Foreign Affairs under SARRIEN. From 1912 to 1913 he was POINCARÉ'S Minister of Social Welfare. In 1920 he became President of the Senate.

BOURGEOIS was the first delegate sent by France to the peace conferences at the Hague, first in 1899 and again in 1907. As chairman of the commission for the question of international courts of arbitration, he brilliantly and tactfully succeeded in bridging the existing differences. In 1919 he was the first chairman of the League-of-Nations Council, in which he continued to figure as permanent representative of France. On the realisation of the League of Nations be published a book, "Le pacte de 1919 et la Société des Nations" (1919). Earlier publications of his with a view to propagating international fraternisation were "La solidarité" (1896), subsequently enlarged under the title of "Essai d'une philosophie de la solidarité" (1902), "L'éducation de la démocratie française" (1897) and "Pour la Société des Nations" (1909).

BOURGEOIS died in Paris on September 29th, 1925.

KARL HJALMAR BRANTING

BRANTING was born in Stockholm on November 23rd, 1860. He first went in for the study of astronomy, which he continued at Uppsala University; thereupon, till 1883, he was assistant at the Stockholm observatory. At the same time he evinced keen interest in the social problems of the day, an interest which was enhanced when various journeys brought him into touch with prominent Socialist leaders. He therefore abandoned his scientific career and, in 1884, became editor of the radical paper, "Tiden." When this publication ended two years later he was appointed editor-in-chief of the newly-founded journal, „Sozialdemokraten," which he continued to conduct until 1917. He was also one of the most active promoters of the Swedish Social-Democratic Workers' Party, founded in 1889, in which he soon came to play a leading rôle.

In 1896 he was deputed to the Riksdag as the first representative of his party. Here his endeavours concentrated on general suffrage, national insurance, and attempts at democratising political institutions of the State. Thus he prepared the way for the great reforms effected in principle by the Swedish Riksdag in 1918.

In 1917 and 1918 he was Minister of Finance in EDÉN'S Liberal Cabinet. In 1920, 1921 to 1923, and 1924 to 1925, he was Swedish Prime Minister.

From 1902 to 1922 BRANTING took part, as Sweden's delegate, in the deliberations of the "Société des Nations" in Paris, and when, in 1922, Sweden was accorded a seat and a vote in the League-of-Nations Council, BRANTING figured, as from 1923, as his country's representative in this assembly.

His book "Socialdemokratiens arhundrade" appeard in two volumes between 1903 and 1906.

BRANTING died in Stockholm on February 24th, 1925.

CHRISTIAN LANGE

Christian Louis LANGE was born at Stavanger, Norway, on September 17th, 1869, studied History, French, and English at Oslo University, and entered upon a pedagogic career. He joined the radical Young-Norway movement started in the seventies, and was one of the most zealous advocates of the political and national programme that aimed at a separation of Norway from Sweden.

In the field of international understanding he first made an appearance when chosen, in 1899, to act as secretary to the IXth Inter-Parliamentary Conference in Oslo. His exceptional aptness for the functions involved, and, more particularly, his knowledge of languages, caused him likewise to be appointed secretary to the Norwegian Peace Committee, instituted, in keeping with the stipulations of NOBEL'S testament, for the award of the Peace Prize by the Norwegian Storthing. In this connection LANGE collaborated at the Nobel Institute in Oslo from 1900 to 1909 with such leading personalities as GETZ, BJÖRNSON, STEEN, LÖVLAND, HORST, and HAGERUP, and also took a prominent part in founding the library of the Institute in 1904.

In 1909 LANGE was elected to succeed GOBAT as secretary-general of the Inter-Parliamentary Union, in which capacity he arranged inter-parliamentary conferences, edited the "Annuaire de l'Union interparlementaire" published as from 1911, and collected the "Documents interparlamentaires" and the "Résolutions."

When the Union was wrecked by the outbreak of the European War, and the Bureau was obliged to quit Brussels, LANGE returned to Oslo and attempted from there to save the institution and keep it alive; in 1921 he had the satisfaction of seeing the inter-parliamentary conferences, interrupted since 1913, finally resumed in Stockholm.

In 1907 LANGE represented Norway at the second Peace Conference at the Hague. *Inter alia*, he initiated the programme of the "Organisation centrale pour une paix durable," which was adopted at the Hague in 1915.

The first part of his elaborate "Histoire de l'Internationalisme" appeared in 1919 (as Volume 4 of the publications of the Norwegian Nobel Institute).

LANGE is deputy-delegate of his country in the League-of-Nations Council.

NOBEL PRIZE for 1922

FRIDTJOF NANSEN

NANSEN, equally renowned as explorer and as philanthropist of exceptional energy and conviction, was born on October 10th, 1861, on his father's estate at Store Fröen, near Oslo. Having studied zoology and biology, he was for a time "conservator" at the Bergen natural-history museum. In 1888 he took his doctor's degree and, two days after his graduation, resolved to cross Greenland on snowshoes. This very first crossing of the international icefields of Greenland he actually managed to effect from the Umivik Fjord to Godthaab (1888/89). On his return, he was employed as a teacher at Oslo University, but in 1893 he again started out on a great voyage of discovery, his famous North Pole expedition on the "Fram," captained by SVERDRUP. Starting from Vardö on July 22nd for the Siberian Arctic, the vessel was icebound to the north-west of the New Siberian Islands and carried by the floating ice in a north-westerly direction, whereupon, accompanied by JOHANSEN, NANSEN set out with dog-sleighs on March 14th, 1895, to penetrate farther into Arctic regions. On this memorable expedition he succeeded in establishing that the North Pole is not situated on terra firma but under Arctic waters. Having wintered in Franz-Josef Land, the explorers were brought back to Norway by the JACKSON-HARMSWORTH expedition.

In 1897 NANSEN was appointed professor of oceanography at Oslo University, and in 1901 director of an international laboratory for deep-sea exploration, in which connection he devoted himself in particular to the hydrographic exploration of the northern seas between Norway and Greenland. Between 1910 and 1914 he undertook other oceanographic voyages of discovery.

Though averse to politics, NANSEN was involved in the political events that culminated in the separation of Norway from Sweden, since, as a patriotic Norwegian, he made no secret of his national sympathies. It was his frankness and sincerity that contributed, when the Union had finally been dissolved, to his appointment as Norway's first envoy plenipotentiary to the Court of St. James; subsequently, he represented his country in Washington in the same capacity.

As an adherent of international peace aspirations, NANSEN was not only active at home, but also figured prominently at similar conferences in various foreign countries. In 1921 he was appointed by the League-of-Nations Council to be chief commissioner for the repatriation of prisoners-of-war from and to Russia. In this capacity he not only succeeded in repatriating hundreds of thousands of ex-combatants, but was also untiring in equipping and conducting relief-expeditions to Russia for the salvation of millions of sufferers in the great starvation-areas in that country.

He was most energetic, moreover, in advocating Germany's inclusion in the League of Nations, and managed to bring about a personal contact between STRESEMANN and BRIAND, thus materially contributing towards the liberation of the German people from political isolation. International arbitration also had a keen supporter in NANSEN, who acted, as from 1927, as Norway's representative in the disarmament committee of the League of Nations.

NANSEN'S literary work dealt mainly with his scientific expeditions. In this respect we may mention, "On Snowshoes through Greenland" (1890), comprising the scientific results of his first expedition, published in collaboration with H. MOHN in "Petermann's Geographic Reports," "Through Night and Ice" (1897, reprinted 1898 with a supplementary volume by NORDAHL and JOHANSEN), "The Norwegian North-Polar Expedition 1893 to 1896, Scientific Results" (compiled jointly with several experts and published in six volumes, 1900—1905), "Northern Water" (1906), "Nord in taakeheimen" (1900—1911), "Gjennem Sibirien" (1914), and "Spitzbergen" (1922). "Norway and the Union with Sweden" (1905, translated into many foreign languages) was his only political publication. Scientifically, NANSEN'S activity was of paramount importance. His discovery that the internal ice of Greenland is a glacier of tremendous dimensions has proved a valuable incentive to glacier-research an to the theoretic study of the ice-age.

NANSEN was founder and chairman of the "International Society for the Exploration of Arctic Regions by means of Aircraft."

The Norwegian nation presented NANSEN with a country-house at Lysaker near Oslo, where he died on May 13th, 1930.

SIR JOSEPH AUSTEN CHAMBERLAIN

Sir Joseph Austen CHAMBERLAIN, eldest son of the well-known statesman and imperialist, Joseph (Joe) CHAMBERLAIN, and brother to the present British Premier, was born on October 16th, 1863, in Birmingham, the city with which his father was so intimately associated. He studied at Trinity College, Cambridge, and later in Paris and Berlin, and decided in favour of a political career, for which he was well fitted, having for several years acted as his father's private secretary. In 1892 he was returned to Parliament by the Unionist Party; ten years later he was Postmaster General, and in 1903, on his father's retirement, Chancellor of the Exchequer, which office he held until 1905. When, after the outbreack of the war, ASQUITH formed his first Coalition Cabinet, CHAMBERLAIN became Secretary of State for India. In 1918 he joined the "War Cabinet," and in the following year was once more Chancellor of the Exchequer, in succession to BONAR LAW. In 1921 he was Lord Privy Seal and head of the Unionist Party.

When, after the close of the war, the Conservative "die-hards" attacked LLOYD-GEORGE'S Coalition, they were opposed by CHAMBERLAIN, who considered a coalition necessary for the solution of post-war problems and to counteract the Socialist menace; this cost him his seat in the Cabinet; nor was he a member of the following Conservative governments. In 1924, however, he was appointed Foreign Secretary in BALDWIN'S second Cabinet.

As the leader of Great Britain's foreign policy, CHAMBERLAIN worked zealously to secure amicable relations among what had shortly before been hostile powers. He opposed the Geneva protocol of 1924, which seemed to him to be contrary to the interests of Great Britain and the Dominions, and advocated a guarantee-pact among the powers. In the deliberations regarding the DAWES reparations plan, he endeavoured, with considerable success, to remove differences of opinion, and it was particularly owing to his mediation that, in 1925, the Locarno agreement was come to between Germany, France, Belgium, Great Britain, and Italy, and the guarantee-pacts between

France, Poland, and Czechoslovakia. Similarly, it was his energetic, but circumspect and tactful intervention that caused Germany to be admitted to the League of Nations. A collection of his parliamentary speeches was published in 1928 under the title of "Peace in our Time."

Sir Joseph CHAMBERLAIN died on March 16th, 1937.

NOBEL PRIZE for 1925

CHARLES GATES DAWES

Charles G. DAWES was born at Marietta, Ohio, on August 27th, 1865. He was at first a railway engineer, but subsequently studied law and settled as a lawyer at Lincoln, Nebraska, where he became both successful and popular. In 1902 he was made president of the Central Trust Company of Illinois, one of the greatest of Chicago banks.

When America entered the war DAWES saw military service, first as a railway-officer controlling troop-transports, and later, on the general staff of the American expeditionary force, rising to the rank of brigadier. From 1921 to 1922 he was at the head of the Budget Bureau in Washington, D. C. In the following two years he presided over the international commission of experts entrusted with drafting a plan for the payment of the German war debts; this was subsequently known as the "Dawes Plan." It was for this unpolitical and dispassionate solution of a difficult question, a solution that did justice to Germany's actual inability to pay, and thereby paved the way for the Locarno agreement, that DAWES was awarded the Nobel Prize, jointly with Sir Austen CHAMBERLAIN, in 1925.

In 1924 he was Republican candidate, alongside COOLIDGE, for the vice-presidency of the United States. Elected vice-president in the following year, he remained so until 1929, when he was appointed American Ambassador in London.

DAWES has also figured as a writer, his publications including "The Banking System of the United States" (1892), "Essays and Speeches" (1915, and "Journal of the Great War" (1921).

ARISTIDE BRIAND

Aristide BRIAND was born at Nantes on March 28th, 1862. Originally a lawyer in his native town, he repaired in 1891 to Paris, where he contributed articles to Socialist newspapers and devoted himself entirely to politics. In 1902 he was elected to parliament for the constituency of Saint-Etienne (Loire). The question of competency as between the Church and the State had meanwhile become acute, and BRIAND very zealously advocated a separation, which he was able to put into effect when Minister of Public Instruction in the cabinets of SARRIEN and CLEMENCEAU.

Upon CLEMENCEAU'S retirement in 1909, BRIAND formed his first Cabinet, which remained in office until 1911; he acted not only as Premier but also as Minister of Instruction and of Internal Affairs. In 1912 he was Minister of Justice under POINCARÉ, in 1913 again Prime Minister, in 1914 Minister of Justice under VIVIANI, and in 1915 once more Premier and at the same time Minister of Foreign Affairs, a post he again held, after interrupting his political activity for several years, in the year 1921.

After BRIAND had gradually passed from the Radical-Socialist Party to that of the Social-Republicans, he began to interest himself in the pacifist movement. He was the first French delegate at the disarmament conference in Washington. In his own country BRIAND worked zealously for a collaboration of all the progressive forces of the nation. At the Conference of Cannes he inclined towards a policy of conciliation in regard to Germany, for which reason he was ousted from office by the radical nationalists during his absence from Paris in 1922. The parties of the Left, which he had succeeded in uniting, once more placed him in charge of foreign affairs under PAINLEVÉ, and soon afterwards reinstated him in the premiership. Failing, however, to stay the progressive depreciation of the French currency, he was again deposed in the following year, but remained at the Foreign Office in the new Cabinet of POINCARÉ.

In his endeavours to arrive at a direct understanding with Germany, he negotiated with STRESEMANN, the German Foreign Minister, and it was mainly the co-operation of these two statesmen that rendered possible the peace-pact of Locarno in 1925. With brilliant eloquence he welcomed Germany's inclusion in the League of Nations, and in 1928 attempted to mitigate the KELLOGG Pact by certain clauses, though on the other hand opposing Germany's demand for a speedier evacuation of the Rhineland and for complete disarmament.

BRIAND wrote a "Rapport sur la séparation des églises de l'état" (1906), and published a collection of his speeches in the Chamber in this connection under the title of "La séparation 1904—1907" (1908). In 1928 he published (remarkable enough, in German and with a preface by STRESEMANN) his book, „Frankreich und Deutschland."

To these two, STRESEMANN and BRIAND, the Peace Prize for the year 1926 was therefore jointly awarded.

Once more Prime Minister in the first half of the present decade, BRIAND fell a victim, together with King Alexander of Yugoslavia, to the bullets of an assassin, as he was driving with the King through the streets of Marseilles on March 7th, 1932.

NOBEL PRIZE for 1926

GUSTAV STRESEMANN

Gustav STRESEMANN was born in Berlin on May 10th, 1878, studied history and political economy in Berlin and Leipsic, acquired the degree of doctor of philosophy, and commenced his practical activity as an organiser of employers' associations. From 1902 he was legal advisor to the Saxon division of the „Verband deutscher Industrieller"; from 1914 till 1923 he was managing director of the „Deutsch-amerikanischer Wirtschaftsverband."

His abilities as an organiser, his extensive knowledge, and his gifts as a speaker soon brought him into the field of politics. Since, through his connection with the great economic associations, he was allied with the National-Liberal Party, the latter deputed him in 1907 to the Reichstag, of which he was a member till 1912 and again from 1914 to 1918. He did such signal credit to the confidence thus reposed in him that BASSERMANN, the leader of the party, designated him as his successor. In 1920 STRESEMANN was elected to the German National Assembly, and took a prominent part in the formation of the German People's Party, which he himself conducted in the Reichstag until 1923. In the latter year he became Chancellor of the Reich and simultaneously Minister of Foreign Affairs.

STRESEMANN'S courageous and steadfast policy which, copiously attacked as it has been, undoubtedly entailed valuable advantages for his country, in the first place aimed at regulating and consolidating Germany's relations with her former enemies; in this task he succeeded in having the DAWES Plan accepted, in the face of vehement opposition. A second step, of yet greater importance for Germany's recovery and rehabilitation, he took by ensuring for his country a place in the international community of states by the peace agreements embodied in the Locarno Pact. That Germany should have been received into the League of Nations and her representatives into the League-of-Nations Council is in the main due to his collaboration with BRIAND, pursued by him with sagacity and unrelenting perseverance. The final evacuation of the occupied Rhine territory and the reduction of the reparations payments (through the YOUNG Plan) are likewise attributable to him.

STRESEMANN frequently came forward as a political writer. We may here mention his books, „Wirtschaftspolitische Zeitfragen“ (1911), „Macht und Freiheit“ (1918), „Von der Revolution bis zum Frieden von Versailles“ (1920), and „Nationale Realpolitik“ (1924). To the supplement of the Encyclopædia Britannica he contributed an article on “Locarno.” His Nobel Lecture, „Der Weg des neuen Deutschland,“ delivered by invitation of the Storthing Nobel Committee at Oslo University in 1927, was published in “Les Prix Nobel” for the preceding year. The year 1926 also saw the publication of his „Reden und Schriften,“ of which P. LUTHER edited a selection in the form of a „Stresemann-Buch.“ (1923).

In the midst of strenuous work in the service of his country STRESEMANN died, deeply lamented, on October 3rd, 1929.

NOBEL PRIZE for 1927

FERDINAND BUISSON

Ferdinand Edouard BUISSON was born in Paris on December 20th, 1841, and studied philosophy at the Sorbonne, where, consideraly later, when himself a university professor, he acquired the degree of "docteur ès-lettres" with a thesis on "Sébastien Castalion" (1892). From 1866 till 1870 he was professor at the Academy of Neufchâtel, Switzerland, and in 1871 was appointed inspector of elementary schools in Paris. This post, however, he was very soon obliged to give up, since his nomination had met with the disapproval of the nationalists. In 1878 he had the satisfaction of being appointed inspector-general of elementary schools for the whole of France, but in the following year elected to accept the influential position of a departmental director in the Ministry of Public Instruction. Here he remained until 1886, when he became professor of pedagogics at the Sorbonne, a post he held until 1902.

BUISSON now dedicated himself entirely to politics. From 1902 to 1914 he represented the Seine department, and in 1919 took his seat in the Palais Bourbon as member of the Radical-Socialist Party, continuing as such until 1924. He fought, in particular, for the so-called "Free School" against clerical education, and in 1905/06 acted as reporter to the parliamentary commission on the question of a separation of Church and State.

His interest in peace ideals had already been aroused on the occasion of a visit to Geneva in 1867, when he took part in the constituting assembly of the International Peace League. The League for Human Rights counted him among its most faithful exponents, and in 1914 elected him its chairman, in succession to Francis de PRESSENSE, the first holder of that office.

He considered the foundation of the League of Nations an important step forward in the peace movement, but this did not prevent him from subjecting the stipulations of the Peace of Versailles to a public and severe criticism. As president of the League for Human Rights, he undertook ardent propaganda for a sincere understanding with Germany, and when, in 1924, a German branch of the said League was founded, he did not let his advanced age hinder him from himself taking part in the deliberations in Mayence and in Berlin.

Between 1882 and 1893 BUISSON published a "Dictionnaire de pédagogie" in six volumes.

The Nobel Peace Prize was conferred jointly on BUISSON and Ludwig QUIDDE. In this connection BUISSON wrote an article on "Les transformation des idées de la guerre et de la paix" (reprinted in "Les Prix Nobel en 1927").

BUISSON died at the age of ninety, on February 16th, 1932.

LUDWIG QUIDDE

Ludwig QUIDDE was born in Bremen on March 23rd, 1858. He studied principally German medieval history, at the universities of Strassbourg and Göttingen. For some time (1890 to 1892) he was secretary to the Prussian Historical Institute, and from 1888 to 1896 he directed the publication of the „Deutsche Zeitschrift für Geschichtswissenschaft," which he had himself founded, but he has at no time held an academic employment; privately he compiled his numerous, for the most part short, historical works, such as „Die Entstehung des Kurfürstenkollegiums" (1884). He also supervised the publication of the „Deutsche Reichstagsakten."

QUIDDE joined the peace movement in 1891, became a member of the International Peace Bureau in Berne, and in 1894 himself founded a peace society in Munich, over which he continued to preside until 1918. From 1893 he was a member of the Democratic German People's Party; from 1907 to 1918 he was a deputy to the Bavarian Diet, and from 1919 to 1920 to the German National Assembly. As a pacifist he wrote two brochures, „Der Militarismus im Deutschen Reich" (1893), and „Caligula, eine Studie über römischen Cäsarenwahnsinn" (1894); the latter, in which he was accused of caricaturing Emperor William II. in the character of Caligula, involved him in a lawsuit which ended in his conviction. The brochure in question was confiscated, but nevertheless ran through more than thirty editions. Subsequent writings in the direction of peace and liberty were „Wetterleuchten der Reaktion" (1895), „Reale Grundlagen für einen dauernden Frieden" (1915), „Die Friedensfreunde in der russischen Revolution" (1917), „Pazifismus und Belagerungszustand" (1917), „Deutschlands Zukunft bei einem Macht- und bei einem Rechtsfrieden" (1917), „Friede im Osten und Friede im Westen" (1918), „Monarchie, Republik, Revolution, Demokratie" (1918), „Völkerbundpolitik" (1919), „Völkerbund und Demokratie" (1920), „Völkerbund und Friedensbewegung" (1920), „Die Schuldfrage" (1921), and various smaller writings. In 1926 he published „Caligula, drei Schriften mit Erinnerungen des Verfassers."

NATHAN SÖDERBLOM

Lars Olaf Jonathan (Nathan) SÖDERBLOM was born at Trönö, in the Gävleborg government of Sweden, on January 15th, 1866. The son of a pastor, he studied theology at Uppsala, took his degree as licentiate of theology in 1892, and was appointed, two years later, pastor of the Swedish church in Paris. Having received a diploma from the religious-science section of the "Ecole des hautes études," he was promoted doctor of theology in the Sorbonne, and in the same year appointed professor of the history of religion at Uppsala (1898). From 1912 to 1914 he was the first to occupy the chair of chief-professor of religious history there. In the latter year he was nominated Archbishop of Sweden and Vice-Chancellor of Uppsala University. He was later accorded honorary doctorates by the universities of Uppsala, Oxford, Greifswald, Oslo, Geneva, St. Andrews, Glasgow, Dublin, Dorpat, Copenhagen and Bonn, besides the membership of numerous learned societies.

Of his many publications we may here mention "Les Tavashis" (1899), "La vie future d'après le Mazdéisme" (1901), "Introduction to the History of Religion" (1920, translated into several languages), "Compendium of Religious History" (sixth edition, 1931), "The Rise of Theism" (in Danish, second edition, 1926), „Naturreligion und Geschichte der Religion" (1914), "The Religious Problem in Catholicism and Protestantism" (1910), "Humour and Melancholy, with other Studies of Luther" (1918), "Life, Faith, and Prayer" (second edition, 1928), "The Congress of the Christian World in Stockholm" (1926), "Story of the Passion" (1928), "Luther's Small Catechism, with Comments" (second edition, 1929), and "The Religion of Revelation" (second edition, 1930). His collected speeches and writings appeared in six volumes in 1929/30.

Untiring work prematurely undermined Archbishop SÖDERBLOM'S health, and after a short illness he died at the age of 65 on July 12th, 1931, lamented by the entire Swedish nation and by all Christianity, for which his personality and activity had been a shining example.

NOBEL PRIZE for 1931

JANE ADDAMS

ane ADDAMS was born at Cedarville, Illinois, on September 6th, 1860, her father being member of the Senate of the State of Illinois. She graduated at Rockford College in 1881, and during the following years travelled in Europe, eagerly studying modern social politics. Eventually settling in Chicago, she founded, in 1889, conjointly with her friend, Ellen Gates STARR, in the poorest district of the city, a settlement modelled on the famous Toynbee Hall established five years earlier at Whitechapel, London. This institution, soon universally known as Hull House, offered an asylum for the homeless and destitute, adults and children alike; attached to it were a school with courses in different subjects, a children's infirmary, clubs, popular restaurants, and the like. An account of it is contained in her book, "Twenty Years at Hull House" (1920).

Working for social progress, Miss ADDAMS early took a keen interest in the promotion of international peace. In 1907 she published a book on "Newer Ideal of Peace." After the outbreak of the Great War she founded the "Women's Peace Party" of America, the programme of which was influenced by the English Union of Democratic Control. Jane ADDAMS was firmly opposed to the idea of American participation in the war, and she seconded WILSON in his efforts as neutral mediator between the belligerent nations. Believing the President would be able to maintain his peaceful attitude throughout, she and her association worked passionately for his re-election in 1916, and were profoundly disappointed at the entry of the United States into the war in the following year.

As a social and pacifist worker Jane ADDAMS has become the most prominent woman in the United States. When Aletta JACOBS and other Dutch women invited women of the belligerent and neutral countries to an international peace conference during the first winter of the war, they offered their chairmanship to Jane ADDAMS, as representing the greatest neutral power. At this conference, which was held at the Hague in the spring of 1915, "The Women's International Committee for Permanent Peace" was founded, with a bureau at

Amsterdam under the management of Mefrouw JACOBS, while Jane ADDAMS acted as international president of the Committee, which sent delegations to the statesmen of the neutral countries, recommending to them a policy of mediation. This women's peace organisation had its first post-war conference at Zurich in 1919, its name being changed into "The Women's International League for Peace and Freedom." Jane ADDAMS presided at this and all subsequent conferences of the League up to that of Prague in 1929, when she resigned.

NICHOLAS BUTLER

Nicholas Murray BUTLER was born at Elizabeth, New Jersey, on April 2nd, 1862. He attended schools at Paterson, New Jersey, and studied at Columbia College, where in successive years (1882—1884) he took his B. A., M. A., and Ph. D. degrees. Meanwhile, his remarkable talents attracted the attention of Professor William BURGESS, who had then but shortly returned from Germany; upon the advice of this prominent historian and jurist, BUTLER repaired for a term to Berlin, where ZELLER and PAULSEN particularly impressed him. After a further term, which he spent in Paris, he returned to his *alma mater* to lecture on philosophy; 1890 saw him Dean of the philosophic faculty and 1901 president of the university. Under his administration Columbia College developed from a small local seat of learning, with which several trade schools were connected, into the greatest national university of the United States.

From Paulsen BUTLER had first learnt to recognise what importance must attach for his own country to pedagogics, if treated as a science on a philosophic foundation; this consideration induced him to found the Teachers' College in New York, in 1889. In the same connection he became the editor of prominent education periodicals and collective works, viz., "The Educational Review" (1889—1920), "The Great Educators Series" (as from 1892), "The Teachers' Professional Library" (1894), „Bibliothek der amerikanischen Kulturgeschichte" (Berlin, 1912), and "Columbia University Contributions to Philosophy and Education" (1888—1902). He was also co-editor of the "International Pedagogic Library."

BUTLER was one of the founders of the College Entrance Examination Board, which standardised the chaotic conditions governing the entrance to the various colleges in the United States; on this Board he presided from 1901 to 1914.

From an early date BUTLER took a keen interest in politics. From 1890 onwards he regularly attended the Republican National Convention as a delegate every four years. In 1920 he was put forward as presidential candidate with 69 votes by the delegation of New York

State. By reason of his intimate knowledge of international politics, and of the ties he had formed with numerous European statesman and rulers, he was specially fitted to play a prominent part in the peace movement. From 1907 to 1912 he was chairman of the Lake Mohonk Conference for International Arbitration. It is owing to him that the economically limited aims of the French pacifist "D'ESTOURNELLES DE CONSTANT" were magnificently extended, on the strength of a gigantic endowment from Andrew CARNEGIE, granted on BUTLER'S recomendation. Since 1910 BUTLER has been a member of the Carnegie Endowment for International Peace, over which he has presided since 1925. Under his guidance this institution took the lead in the development of a pronounced peace-spirit among the nations of the world.

Thirty-two American and European universities have accorded BUTLER the distinction of an honorary degree, while orders and other distinctions have been conferred on him by twelve European states.

His writings include "The Meaning of Education" (1898), "True and False Democracy" (1907), "The American As He Is" (1908), "Education in the United States" (1910), "Philosophy" (1911), "Why Should We Change Our Form of Government?" (1912), "The International Mind" (1913), "A World in Ferment" (1918), "Is America Worth Saving?" (1920), "Scholarship and Service" (1921), "Building the American Nation" (1923), "The Faith of a Liberal" (1924), "The Path to Peace" (1930), and "Looking Forward" (1932).

NOBEL PRIZE for 1934

SIR NORMAN ANGELL

Norman ANGELL, son of Thomas Angell LANE, was born in the little Lincolnshire town of Holbeach in 1874. After attending a private preparatory school and the local grammar school, he was sent to the Lycée de St. Omer, in the French department of Pas-de-Calais. On his return to England he was for some months at a business-training college in London, and then went to Geneva for a year, doing some journalistic work and attending lectures at the university.

A year or so after quitting Geneva he decided to see America, and emigrated to the Far West, where for some six years he was prospector, cowboy, and rancher, his wanderings carrying him as far afield as Mexico.

After this lengthy stay in America, the last year of which was devoted to journalism (including dissertations on the causes of the Spanish-American War), ANGELL returned to Europe as correspondent of several American papers, one of his first journalistic tasks being that of sending daily reports on the DREYFUS affair. Later he became attached to the editorial staff of a French paper and, later still, edited an English paper appearing in Paris. The outbreak of the Boer War found him, as an editorial writer, consistently opposing the policy that led to it.

His experiences of the American temper in the war against Spain, French chauvinism in connection with DREYFUS, and British jingoism in the Boer conflict, promted his first book, entitled "Patriotism under three Flags: a Plea for Rationalism in Politics" (1903). The year following its publication he became manager of the Paris Daily Mail, starting a business connection with Lord NORTHCLIFFE which lasted for some ten years, the friendship lasting until the latter's death. ANGELL never disguised his fundamental disagreement with NORTHCLIFFE'S policy, in direct criticism of which many articles from his pen appeared in NORTHCLIFFE'S own press.

In 1908 ANGELL published "Europe's Optical Illusion," expanded in the following year into "The Great Illusion." This book has been translated into about twenty languages; latterly, a new edition was published as "The Great Illusion, 1933." In 1912 ANGELL retired from the management of the Paris Daily Mail in order to devote himself entirely to promoting the ideas embodied in his book; in the same year a "foundation" was established in Great Britain to assist him in this work, the directors being Sir Richard GARTON, the late Lord ESHER, and the late Lord BALFOUR.

The outbreak of the war in 1914 severed this connection. ANGELL'S main concern about the war (he has explained) was to see it stopped as soon as possible. Together with the late E. D. MOREL, J. R. MacDONALD, Sir Charles TREVELYAN, Mrs. SWANWICK, and Lord PONSONBY, he formed the "Union of Democratic Control," aiming at insistence on a workable peace and open diplomacy. During the war ANGELL (after a term at the front in a private ambulance) paid two long visits to the United States, where he was an active participant in certain American movements for the creation of a "league of nations." He was in Paris during the last two months of 1918, and attended the Second Socialist International in Berne in the following year.

During the ensuing decade books dealing with the international problem appeared from ANGELL'S pen at the rate of about one a year, while he annually visited the United States for the purpose of lecturing. In 1929 he was elected to Parliament, received a knighthood in 1931, did not stand for re-election after the formation of the National Government, and has since given an increasing proportion of his time to conjecturing what type of popular education may best equip the millions for citizenship, and best enable them to understand the world in which they have to live. One of his more recent books, "The Unseen Assassins," outlines the problem of education for citizenship as he sees it.

His latest book, "Preface to Peace," indicates why he regards public opinion as the fundamental and determining factor of the peace problem.

ANGELL is a member of the Council of the Royal Institute of International Affairs, of the Executive Committee of the League of Nations, and of the National Peace Council. The Nobel Peace Prize was awarded him jointly with Arthur HENDERSON.

ARTHUR HENDERSON

Arthur HENDERSON was born in Glasgow in 1863. Educated at Newcatle-on-Tyne, he was apprenticed to the iron-founding trade in that city and in 1883 joined the Friendly Society of Ironfounders, of which he became an official in the following year. In the course of time he was elected to various city and county councils, and in 1903 was mayor of Darlington. In the same year he successfully contested the Barnard Castle division as Labour candidate with the support of his trade union, and represented that constituency in the House of Commons until November 1918; later he sat for the Clay Cross division of Derbyshire. For some time he was chairman of the Labour Party, subsequently secretary of the National Council of Labour, and member of the Board of Trade Arbitration Court and of the Industrial Council. During the war he was chairman of the National Advisory Committee on War Output, and in 1917 was sent on a government mission to Russia. He presided over the War Emergency Committee and sat on numerous welfare and relief boards, notably such for Belgian refugees and disabled soldiers and sailors.

In January 1915 he was created a Privy Councillor, and in May of that year, on the formation of the Coalition Government, was appointed President of the Board of Education. In 1916 he became Paymaster General and Labour Adviser to the government. On the reconstruction of the Ministry in December 1916 he was made a member of the War Cabinet. Latterly, he was Home Secretary in the first Labour government (1924), and Secretary of State for Foreign Affairs in MACDONALD'S second administration (1929). As such he attended the League of Nations Assembly in Geneva, where he used his utmost endeavours in the interests of international conciliation.

A prominent member of the Methodist Church, HENDERSON was a lifelong abstainer and temperance reformer. His numerous booklets and pamphlets included "Aims of Labour" and "Labour's Way to Peace."

He died in 1935.

CARL VON OSSIETZKY

Carl von OSSIETZKY was born in Hamburg on October 3rd, 1889. Upon completing his studies he was for a time a clerk in the Hamburg municipal service, but abandoned his clerkship ere long in favour of a publicist's career, having at the age of twenty already produced some political poems which found publication in the Liberal periodical, „März“, in Munich. An ardent admirer of British political institutions, he devoted keen study to the British constitution. He went through the war as an infantryman on the West Front, though he had long been a confirmed pacifist and a republican. Soon after the war he started editing a radically pacifist review in Hamburg, under the title of „Die Revolution,“ but it was of no long duration. He became Chairman of the Hamburg branch of the „Deutsche Friedensgesellschaft“, and was summoned to the society's headquarters in Berlin in 1920 to act as its secretary general. One year later, however, he gave up this position and worked as a political reporter to the publications, „Tagebuch“ and „Montag Morgen“; as from 1926 he also contributed to „Die Weltbühne,“ of which he became editor-in-chief in 1927.

In the questions of the international peace movement, OSSIETZKY was one of those who visualised a solution of the peace problem in the promises of the Peace of Versailles, demanding that the victorious powers should reduce their armaments to the level attained in the disarmament of Germany. His pacifist convictions made it impossible for him to approve either of German rearmament or of the armaments in other countries in a corresponding proportion. His passionate literary advocacy of disarmament and international peace brought him into conflict with the German State authorities.

CARLOS SAAVEDRA LAMAS

Carlos Saavedra LAMAS was born at Buenos Aires on November 1st, 1878. He studied law in his native city, where he became professor of international law. As Argentinian delegate, he took part in the Conference of Jurists in Rio-de-Janeiro in 1927 and in the VIIth Pan-American Conference in Montevideo in 1933; at the International Labour Congress of 1928 he occupied the chair. In 1932 he was appointed Minister of Foreign Affairs in the Argentinian Government.

In the same year he worked out a plan for an international agreement, the purpose of which is the prevention of war. This "tratado anti-bellico" was signed in Rio-de-Janeiro on October 10th, 1933, by the representatives of six South American states, while other American and various European states have since acceded thereto. In 1935 LAMAS presided over the conference which settled the "Gran Chaco conflict" between Bolivia and Paraguay; he also played an important part at the Pan-American Conference of 1936 in Buenos Aires. In the latter year he was, moreover, elected Chairman of the League-of-Nations meetings.

His publications include "Traités internationaux de type social" (1924), "La conception argentine de l'arbitrage et de l'intervention à l'ouverture de la Conférence de Washington" (1928), and "La crise de la codification et la doctrine argentine du droit international" (1930).

LORD CECIL OF CHELWOOD

Lord Edgar Algernon Robert CECIL, now the Viscount CECIL OF CHELWOOD, was born on September 14th, 1864, the third son of the famous Marquess of SALISBURY, Premier of Great Britain, who died in 1903, and cadet of a family that has given England a number of prominent statesmen, first and foremost among them that William CECIL, Lord BURLEIGH, who laid the foundations of his country's hegemony in the days of Queen Elizabeth.

Having studied at Eton and Oxford, Lord Robert started his political career in 1886 as private secretary to his father, but soon entered upon the legal profession, and did not return to politics until 1906, since when, with but short interruptions, he continued to figure as a Conservative M. P. until his elevation to the Peerage.

In Parliament he attracted attention during the war by his pronouncedly moderate attitude. He represented Great Britain on the Allied Maritime Transport Council. From 1915 to 1916 he was Under-Secretary for Foreign Affairs, and from 1916 to 1918 Blockade Minister. He was one of the delegates to the Paris Peace Conference in 1919. He represented South Africa at the first, second, and third assemblies of the League of Nations, in the Supreme Economic Council of which he was the chief British representative from 1919 to 1927. He was British delegate to the League on many occasions between 1924 and 1927, and has been British delegate to many League commissions since then. Thus he was chief British delegate to the Opium Conference in 1925. Ever since the inception of the League, he has advocated the principles of justice in its development, publicly supporting SMUT'S opinon that a mitigation of the peace treaties ought to be initiated by the League. As joint-president (since 1919) of the League-of-Nations Union, he began a public campaign on the disarmament question. In December 1924 he was awarded the first Woodrow Wilson Peace Prize.

In May 1923 Lord Robert CECIL joined BALDWIN'S first Cabinet, his special task being that of safeguarding Great Britain's relations with the League of Nations; he held the same office in BALDWIN'S second Cabinet (of November 1924), but in 1927 resigned both his Cabinet seat and his representation of British interests in the League on the grounds, as he pointed out in a letter to the Premier, that he no longer saw eye to eye with the majority in the Cabinet on the question of disarmament. When the Labour Government came into office in 1929, he placed his services at its disposal, and became one the most zealous members of the Geneva disarmament committee. To the idea of general disarmament he has continued his allegiance to the present day.

PART THREE

PORTRAITS AND SIGNATURES
OF
PRIZE-WINNERS

I.

BEARERS OF THE PRIZE FOR PHYSICS

(Biography page 31)

Dr W. C. Röntgen

WILHELM KONRAD RÖNTGEN

(Biography page 33)

H. A. Lorentz

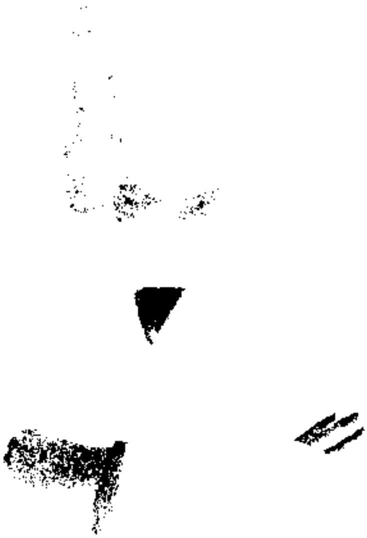
HENDRIK ANTOON LORENTZ

(Biography page 35)

P. Zeeman

PIETER ZEEMAN

(Biography page 37)



Henri Becquerel

HENRI BECQUEREL

(*Biography page 39*)

P Curie

PIERRE CURIE